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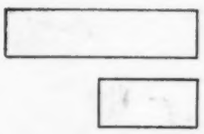

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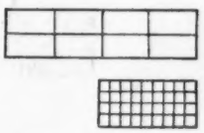

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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

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Balloon Tire Situation Puzzles Car Manufacturers

Many feel that publicity on new casings was premature. Some report sales lost through inability to supply low pressure equipment. Action is likely soon.

By Norman G. Shidle

THE automotive industry is standing on the threshold of major developments in the balloon tire situation. It appears almost certain that definite steps will be taken within the next few months to get constructive action on problems of standardization, supply and demand, publicity and similar questions which at present are causing untold confusion and considerable loss of time and money. Car manufacturers are somewhat puzzled as to the best method of meeting the demands which have rushed upon them, but a lot of constructive thought is being given to the question.

This is the almost inevitable conclusion reached by any observer with his ear to the ground. Rumbles of dissatisfaction with the manner in which balloon tires have been brought before the public are coming from all directions. Individual car manufacturers are beginning to protest vigorously against being forced into use of a particular type of tire before they have had time to test its merits thoroughly and to redesign other parts of their vehicles to take care of technical difficulties which arise with its use.

TIRE dealers are not at all pleased with the prospect of having to double their stocks, and some of them are reporting that curiosity in regard to balloon tires is considerably in excess of buying demand. Tire manufacturers are inclined to blame each other for various difficulties which have arisen, to lay at the door of the car manufacturers responsibility for the multitude of sizes, cynically called "standards," which are being made, and are at odds among themselves as to the type of balloon tire most satisfactory from a technical standpoint.

The clouds have been gathering for some time and there is every indication that something is going to happen soon. For a while the balloon tire was the concern chiefly of technical men and engineers, who argued its merits and faults quite vigorously for a number of months. Then came the publicity campaign, waged throughout the country. Newspapers, popular magazines and trade publications have been flooded with information and propaganda for the new tires. Public demand has grown tremendously and new car prospects are demanding balloon equipment.

SOME car dealers have met this demand by putting so-called semi-balloons on standard rims, while others have been unable to do so because such tires leave insufficient fender clearance or interfere with steering on the particular car which they are selling. In some instances dealers find it difficult to get rid of the cars in stock unless they are willing to scrap the standard tire and wheel equipment. In addition to these technical difficulties, the car dealers have been unable to get enough of the new tires to supply the demand when they are willing to make changes in original equipment. The publicity campaign of the tire makers has been so successful that it has far outrun their immediate ability to produce balloon tires.

These events have taken the balloon tire out of the realm of purely engineering interest. It has become a commercial problem of very practical significance. Executives of car manufacturing companies have begun to look askance at this innovation which bids fair to interfere with spring business.

Recently the clouds have gathered more thickly and the rumblings of dissatisfaction with the handling of the balloon tire situation have become louder. It has become increasingly apparent that some reasonable degree of standardization of balloon tire sizes must be accomplished very soon unless the tire and car industries are willing to sacrifice hundreds of thousands of dollars on the altar of Isolation.

THE opinion of car manufacturers concerning the present balloon tire situation is outlined in the accompanying article. The summary given is the result of analyzing opinions expressed by a large number of important executives of passenger car companies.

Most of these executives are quite definite in their dissatisfaction with current balloon tire conditions, but, on the whole, seem a bit puzzled as to just what remedies ought to be applied. The special committee recently appointed by the N. A. C. C. should serve admirably as a means of crystallizing opinion into action.

It is useless to expect any generally satisfactory balloon tire standards unless some measure of cooperation is achieved between the tire and car manufacturers. As pointed out by AUTOMOTIVE INDUSTRIES several months ago, the car manufacturer is vitally concerned with the standards adopted and cannot be expected to accept without question any schedule in the making of which he has not had a part.

The practical truth of this contention is borne out strongly by replies from the presidents of leading passenger car companies to a series of three questions bearing on the present balloon tire situation. These were the queries:

1. What do you think of the set of 23 balloon tire standards which has been set up by the Rubber Association of America? Do you believe that this set of standards is satisfactory from the standpoint of the car manufacturer or do you think that it should be revised through a conference of representatives of both car and tire industries?
2. What can be done to reduce the present disparity between public demand for balloon tires and the ability of tire manufacturers to supply them?
3. What has been your experience in the use of so-called balloon tires on cars with wheels of standard size?

Car manufacturers are practically unanimous in thinking that the 23 "standards" set up by the Rubber Association of America are unsatisfactory. Individual opinions on these standards range all the way from the view that they are "too numerous and should be reduced" to the belief that "the whole business of standardizing balloon tire sizes is about as bad as it could be" and that "the 23 balloon tire sizes as established are a bad hash."

Some executives are more reserved in their statements than are others, but the general impression given by a number of opinions is that the balloon tire committee appointed by the National Automobile Chamber of Commerce will have plenty of support from its constituents in any active remedial measures it may undertake.

He would be a bold man who would attempt to say definitely how all of the problems in the present situation might be solved quickly to the advantage of all concerned. One thing is quite evident, however. Nothing can be accomplished so long as the interests involved insist on playing lone hands and in standing fast for individual rights to the detriment of progress for the industry as a whole.

The car manufacturers individually and collectively always have been willing to get together with any interested group to discuss the questions at issue. Matters of standardization, the manufacturers have insisted—and quite logically—should be handled through the Society of Automotive Engineers which represents, as it were, the engineering department of the industry. Thus far efforts at any substantial cooperation have met with little success.

Difficulties of Cooperation

Cooperation, however, is not without its difficulties. While a desire for coordinated effort is essential to any progress, that in itself will not meet all the needs of the present situation. The criticism has been leveled against the S. A. E. that its standardization procedure is too slow to cope with a situation demanding immediate action such as is necessary in the present instance. Temporary working "standards" are needed, it is claimed, which later may be replaced by final permanent standards adopted through the regular lengthy procedure.

It is contended by some that lack of such a procedure has been one of the chief obstacles to more extended cooperation between tire and car representatives in setting up balloon tire standards.

However this may be there is nothing in the constitution or by-laws of the S. A. E. to prevent rapid action in any given case when the necessity arises. A good many prominent car engineers believe that considerable care is necessary in setting up even temporary standards if the body approving the schedules is not to find it necessary to eat its own words within a very short time.

The present problem in connection with balloon tire standards is much the same as that which confronts every automobile production manager when sales are brisk—speed must be combined with quality. It's not an easy job, but the production men in the factories have been able to do it and the men who manufacture standards should be equal to the task as well.

Reasons for 23 Sizes

From the standpoint of the tire manufacturer it is not especially difficult to justify the 23 sizes of balloon tires which the Rubber Association has approved. Eight of these are sizes intended for replacement on present standard 23, 24 and 25-in. rims. Of the remainder, four are sizes for 22-in. rims, which have been dictated, as we understand it, chiefly by the demands of one large car manufacturer. This leaves eleven sizes for 20 and 21-in. rims of which five are the original sizes approved. The remaining six are, in the view even of some tire makers, not strictly necessary, but are sizes which, at least for the most part, have been included in the list because they were wanted by individual car manufacturers.

Firestone, among the large producers, is understood to have confined its production thus far to only the five sizes first approved by the Rubber Association, and there is reason to believe that others would be glad to do likewise except for the replacement sizes which, in a sense

at least, are not of direct interest to car manufacturers, since they are intended chiefly for cars already in service.

Certainly no tire manufacturer is desirous of making any more sizes than are definitely demanded by his customers. If the car producers can agree among themselves to limit the number of sizes they will demand, it seems reasonable to suppose that the tire producers will make only those sizes so far as original equipment business is concerned. If, however, any large car producer demands an "odd" size, whether it is on the list or not, it is likely to be made by some tire company with others quickly following suit and complicating the situation to just that extent.

Cooperation Essential

Calling names is not going to help. It is true that many car manufacturers have been demanding special sizes of balloon tires and that these demands have made it difficult if not impossible for the tire companies to stick to a few sizes in their manufacturing program. Whether or not this would have been true had these same car manufacturers been around the table when the original standards were decided upon is another question.

It is true that the tire companies cannot agree among themselves on many technical phases of balloon tire design and that they are engaged in a keen battle for business and individual advantage which daily departs from some recognized law of business economics. If we were to list all the things that somebody is saying about somebody else the roll might fill several volumes. And we wouldn't be any farther along when we finished than when we started. The big question is, "What can be done about it?"

The only immediate answer that can be given is "Get together." It is inconceivable that committees representing the car manufacturers, tire manufacturers, automotive engineers, tire dealers and car dealers could sit around a conference table, lay down all the cards face up, talk frankly with one another and come away from the session without having accomplished at least some forward step to better present conditions.

Confidence in the tire manufacturers is expressed by the president of one automobile company whose prominence is such as to render his opinion of exceptional importance. He says:

"I feel that as soon as the car manufacturers take up seriously the question of standard or optional equipment of balloon sizes, that the tire manufacturers will prepare themselves quickly to supply the demand. The tire companies have always in the past been responsive to the demands placed upon them, and I see no reason why they should fall down in this instance."

What the Car Makers Think

The balloon tire has not yet been developed to the stage where final decisions can be made on all technical and commercial problems relating to it. But the demand for such tires has arrived. Immediate, even though temporary, decisions of some kind must be made. Everybody will save trouble and money during the next twelve months if those decisions are made as the result of a few frank conferences between all factions concerned.

The opinion of representative manufacturers concerning standards is well summed up in the following quotations from executives in companies, each of which produced more than 10,000 cars last year:

"There are too many balloon tire standards. There ought to be a few standard sizes which could be adhered to and which can be produced in satisfactory quantities.

'It seems to me that there can be only one opinion concerning the multiplicity of balloon tire standards that have been set up. The number of sizes should be reduced. Probably the only way to arrive at this result is through conference between the representatives of the tire and passenger car industries."

"The balloon tire proposition has been rushed so fast and advertised so heavily that many people have not been able to use the logical sizes on account of mudguard and body interference. The original four sizes proposed by the Rubber Association were much better than the present set of 23 standards."

"The 23 balloon tire sizes set up by the Rubber Association are not consistent with the demand of the car manufacturer owing to the Rubber Association's utter disregard of the manufacturer's needs and its opposition to permitting car manufacturers to counsel with them when decisions were to be made on standard sizes. Great good can come from a conference between the Rubber Association and car manufacturers in eliminating a great many sizes available today and in standardizing more desirable sizes for the benefit of all concerned."

"The situation that calls for 23 balloon tire standards is most deplorable. I thought that in January when we concurred with the rubber people on a comparatively small number of balloon tire sizes that it started action along the proper lines. This agreement was the result of a meeting between the S. A. E. Standards Committee, a number of motor car manufacturers and some representatives of the tire industry. It is possible that another conference might correct some of the chaos, but I feel somewhat doubtful on this point, as the sudden demand for balloon tire equipment has caused many manufacturers merely to do something expedient to take care of existing stock conditions or chassis layouts."

"I do not think that the 23 balloon tire standards set up by the Rubber Association will meet all conditions which may arise. I do believe, however, that about 12 or 15 sizes should be established which would take care of all conditions of road clearance and proper inflations as well as body and fender clearances."

TIRE manufacturers are not desirous of building a multitude of balloon tire sizes. Heavy criticism is being levelled against the 23 standards which have been set up, but probably nobody would be more pleased to have that number reduced than the companies which build the tires.

Since both tire and passenger car manufacturers seem to want a decrease in number of balloon tire standards, it would seem that a frank, friendly conference between representatives of the two industries might go far toward accomplishing the desired result.

While leading car makers feel strongly that the present situation is deplorable and that something should be done about it, few of them have any very definite notion of exactly what remedies might be applied immediately. The opinion of those who did express themselves definitely on this point can be summed up tersely in the phrase:

"Cut out the publicity!"

It seems to be pretty generally agreed among the car

builders that tire manufacturers acted too quickly in putting out such a tremendous volume of balloon tire advertising before they were ready to produce such tires on a large scale and before car engineers had a chance to study carefully the effect of the new tires on present car designs. "If the tire manufacturers had left the introduction of the balloon tire to the automobile manufacturers the proposition would have worked out much better," the president of one company says, while his opinion is confirmed by another executive who thinks that "the tire manufacturers made a big mistake when they saw fit to go out on a large scale to sell balloon tires when they weren't ready for production and placed the automobile manufacturers in a most embarrassing position."

As regards the desirability of a conference with tire builders to straighten out the entire balloon tire situation and as regards the advisability of cutting down balloon tire publicity very materially, the leading car executives seem to be in substantial agreement. Some of them express their views more forcefully than others and a few are a bit indifferent, but a large proportion of the more influential producers are mincing no words.

Semi-Balloon Type Opposed

When it comes to the advisability of using semi-balloon tires on standard rims, however, a slight difference of opinion seems to exist, but the overwhelming majority of car makers are opposed to this practice even as a temporary expedient. Practically all of them feel, moreover, that the eventual tire will be a full balloon type. Following are a few representative views on this question which is of great immediate importance:

"Our experience in the use of so-called balloon tires on cars with wheels of standard size is unsatisfactory."

"Judging from the history of tire evolution, the theory of a narrow rim on a big tire, particularly one with soft walls and low pressure, will not be conducive to the satisfaction of the owner."

"We believe that balloon tires on standard rims will not meet the final demand of the public and it is necessary, therefore, to use special wheels suitable for full balloon tires only."

'We have had only slight experience with the so-called balloon tires on cars with wheels of standard sizes and do not approve of this type of balloon tire."

"We do not believe in balloon tires on regular wheel sizes."

"We have found that the so-called balloon tires to be used on standard wheel sizes deflect gear ratios, turning radius, wheel housing clearance, prevent use of chains, and are deflated to a degree that tire mileage will be reduced 20 to 30 per cent over the standard high pressure tires which have been in vogue."

"I do not believe that so-called balloon tires for standard wheels are practical."

"So-called balloon tires to be used on wheels of standard size is merely a merchandising expedient and is very much to be deplored. They do not give, in my opinion, results that are at all satisfactory."

Difference of Opinion

One dissenting manufacturer says that "the use of so-called balloon tires on cars with wheels of standard size seems to offer no present difficulties."

Some factors in the situation as it exists today are a bit difficult to reconcile. With a good many car manufacturers reporting sales lost because of inability to get balloon tires with which to replace standard sizes it would seem that a tremendous demand for the balloon type exists from the buying public. A recent survey made by *Tires*, a tire dealer publication, however, indicates that tire dealers in general are not experiencing any overwhelming demand for the balloon type. Opinions from dealers all over the country indicated a belief that the balloon tire eventually would replace the high pressure type, but reports from various sections show that actual demand is not particularly great.

As regards New England, for instance, *Tires* says that "while the dealers in Massachusetts reported that practically all of their customers evinced an interest in balloon tires, the new casing apparently has not stirred up the dealers in Maine, for responses indicated that only a small percentage of the visitors to dealers' stores in that State asked questions concerning it."

Dealers Report on Balloon Tire Demand

The report developed also the following facts:

1. New York City dealers are lukewarm concerning balloon tires, but retailers in other parts of the State report a large number of inquiries. In New Jersey there have been many inquiries and few sales.

2. Balloon tire interest in the South has not advanced beyond the curiosity stage.

3. Deep interest in balloon tires is being evinced throughout the Middle West with large sales in the big cities.

The car manufacturers' and the tire dealers' views on balloon tire demand probably can be reconciled by the fact that buyers are demanding balloon equipment strongly when purchasing a new car, but that many owners are willing to stick to their present tires so long as they continue to run their present vehicles.

The favorable attitude toward the balloon tire evinced by a large majority of the car manufacturers indicates that the low pressure type will be used as standard equipment to an increasing extent as time goes on.

Two factors are hindering more rapid adoption at the present time—inability to get sufficient balloon tires and unwillingness to change chassis design at the present moment. Both of these are temporary, however, and will not hold back use of balloon tires to any material extent after a few months.

Point of Agreement

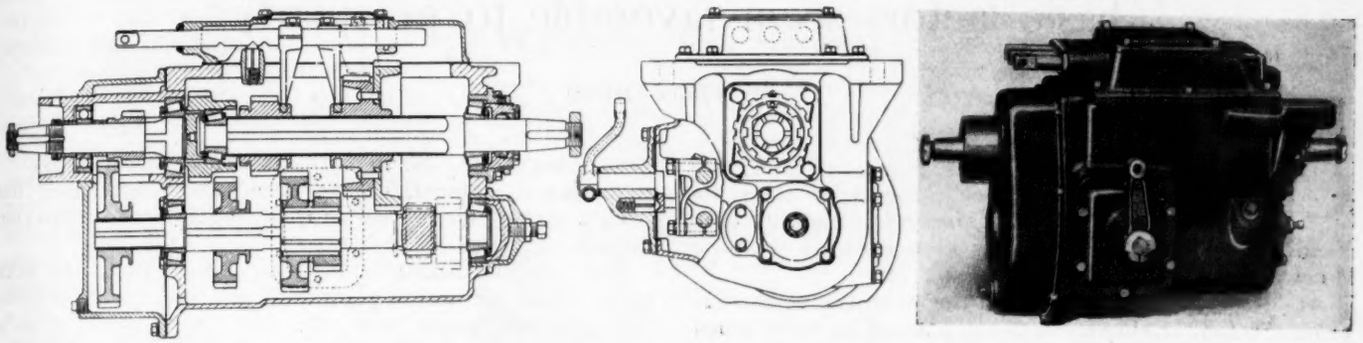
There seems to be just one point on which everybody agrees. Balloon tires have come to stay. The car of the future will run on low pressure casings and steering gears, fender clearances and other design features will be made to suit the new conditions. Tire makers, car manufacturers and retailers all seem to be agreed that the use of balloon tires will increase from now on, that experimental work finally will eliminate the chief objections to them, and that they will be put on new cars as original equipment more frequently as time goes on.

This common belief in the growing future of the balloon tire seems to be the logical starting point for conference between the vehicle and tire industries. Around it must be built by sincere, unselfish, cooperative effort a structure of sound technical and merchandising action.

THE Grand Prix of Europe for 1924 will be held under French auspices. This decision was made at a meeting at which France, Belgium, Italy, Spain, Austria and the United States were represented. Absence of the British is held accountable by the French for the decision that superchargers will be permitted again as heretofore, only France and Belgium having voted against the proposition.

New Brown-Lipe Maximum Transmission Used in Standard Truck

Seven forward and two reverse speeds make it possible to meet a large range of operating conditions. Constant mesh pinions are replaced by a pair of sliding gears with separate control.



Three views of the new Brown-Lipe Maximum Transmission which affords seven forward and two reverse speeds

SEVEN speeds forward and two reverse are utilized to increase maximum speed by 52 per cent and low gear reduction by 50 per cent in the Standard Truck Company's models 3½-K and 5-K. This is accomplished by the use of the Brown-Lipe Maximum Transmissions, models 55 and 60 respectively, as standard equipment.

As applied to the model 3½-K, with a rear axle reduction of 8¾ to 1, this installation permits a maximum speed of 19 m.p.h. at the regular governed engine speed, which is 1200 r.p.m. This speed is obtained with the transmission set in the high speed arrangement. When shifted over to low gear in the low speed arrangement, the maximum total gear reduction is 83.1 to 1, or 1.6 m.p.h., at the same governed speed. With the latter arrangement, tractive ability is the limiting element when loads are started under adverse conditions.

As illustrated by Fig. 1, which shows sectional views of the model 60 gear box, the single constant mesh gear which is characteristic of conventional designs is replaced by two gears, either of which can be engaged at will. The smaller of these gears is contained within the gear box proper, while the larger is enclosed in an auxiliary housing that bolts on to the front of the gear box.

A roller bearing in the conventional position provides a support adjacent to the point of pressure application when either gear is engaged. The larger gear, which is overhung, is shifted to the rear for engagement, while the smaller or high-speed gear is shifted forward. An interconnected separate lever control eliminates the possibility of the two gears becoming engaged simultaneously. This control is actuated by a separate hand lever which is placed adjacent to the regular gear shift lever.

Using the standard governed speed of the engine, 1200 r.p.m., as the base, the following tabulation indicates the speed range of the truck when the high-range gear is in use and then when the low gear is engaged. The figures for the former standard transmission are also included:

It will be noted that the high-speed gear is somewhat smaller than the next gear back on the countershaft.

MAXIMUM TRANSMISSION IN HIGH RANGE
Gear reduction at axle—8¾ to 1

Speed	Transmission Reduction	Total Reduction	M.p.h.
First	3.95 to 1	34.5 to 1	3.7
Second ..	1.89 to 1	16.5 to 1	7.9
Third ...	1.00 to 1	8.7 to 1	15.0
Fourth ..	.78 to 1	6.8 to 1	19.0
Reverse...	4.65 to 1	41.5 to 1	3.1

MAXIMUM TRANSMISSION IN LOW RANGE

First	9.5 to 1	83.1 to 1	1.6
Second ..	4.53 to 1	39.6 to 1	3.2
Third ...	1.88 to 1	16.4 to 1	7.9
Fourth ..	1.00 to 1	8.7 to 1	14.9
Reverse...	11.18 to 1	97.8 to 1	1.3

FORMER FOUR-SPEED TRANSMISSION
Gear Reduction—10.33 to 1 at Rear Axle

First	5.35 to 1	34.5 to 1	2.35
Second ..	2.84 to 1	29.33 to 1	4.4
Third ...	1.76 to 1	18.2 to 1	7.1
Fourth ..	1.00 to 1	10.33 to 1	12.5
Reverse...	6.3 to 1	65.00 to 1	1.9

Consequently when these two gears are engaged the propeller shaft rotates at a greater number of revolutions per minute than the clutch and crankshaft, so that normal engine speed produces a higher road speed for returning light and similar conditions.

Maximum governed speeds range from 1.6 m.p.h. to 19.0 m.p.h., with intermediate speeds that should fit practically every transport consideration and combination of load and speed. The high-gear reduction attendant upon the lowest speed insures a very high torque at the rear axle, which is of great benefit in getting out of excavations. The limitation under this condition is the road bed, which must be sufficiently solid to provide traction and support the weight of the loaded truck. After the load is delivered, much time is saved by engagement in high gear for the light return trip. As the higher road speed is obtained at no increase of engine speed, the efficiency of the engine is therefore increased. Consequently the fuel consumption for a given amount of hauling and return should be somewhat lower.

Business Engineers Look to Future With Confidence and Caution

Volume is greater than ever before at this time of year, but spring has not given usual stimulus to buying. All basic factors seem favorable to prosperity.

By James Dalton

CAUTION!

The yellow lights are being raised all along the business right of way. Engineers are keeping their hands on the throttles and their keen eyes are scanning closely the track ahead.

At the first flash of red they'll throw on the brakes and avoid a crash. Express trains can't maintain their schedules when cautionary signals are out, but it's much better to be a bit late than to be wrecked while running at high speed.

When business smashed into a solid wall of sales resistance in 1920, the impact was terrific because the tracks had been clear so long the oil had evaporated from yellow lanterns and the men who were supposed to swing them had gone to sleep. The wreck was one of the worst in the history of American business and the casualties were terrible. Since that time the block signal system has been put in perfect condition and everybody is on the alert.

Business in almost every line undoubtedly has slowed up perceptibly within the last month but the slackening has not been sharp enough to warrant serious apprehension. In most cases it has been inspired rather by caution than by necessity. Its volume is greater than ever before at this time of year, but the usual spring stimulus to buying has been somewhat lacking. Buyers are just as much inclined to be cautious as are sellers.

Sales Lag Slightly

Bad weather in most sections of the country may be chiefly responsible for this condition, but if this has been the cause the fact should soon become apparent. If a few bright days bring a renewal of demand for goods at retail in the same volume as in recent months, then business engineers can open their throttles again.

On the other hand, if sales continue to lag notwithstanding gentle breezes and a warmer sun, the need for caution will be intensified, for it will be evident that the reluctance to buy is not merely a manifestation of temporary indifference. The globes in the yellow lanterns should be kept scrupulously clean, therefore, for the next two or three weeks, so that the speed can be reduced still further if it seems the part of wisdom.

Unless there is a sudden shift of sentiment, it is highly unlikely that the trade records established in 1923 will be bettered this year. It was scarcely to be expected that they would be even under the most favorable circumstances, for in most lines they were better than ever before.

There is no sound economic reason, however, why there should be a large decline in the aggregate of trade. Seldom, in fact, have the usual determining characteristics been more sound. Some of the favorable auguries are:

1. Money is plentiful and cheap and there never has been a serious depression in this country when those conditions prevailed.

2. The construction industries, which form the arch upon which our recent prosperity has been built, promise to reach new peaks this year and commitments already made are so heavy that a sharp shrinkage in operations does not seem possible for the rest of this year, at least.

3. The iron and steel industry is doing a very large business.

4. Even if sales of new automobiles decline, the demand for automotive products for replacement purposes will be very heavy. The truck market continues steady.

5. Europe's outlook is brighter than it has been at any time since the war began and there is strong ground for hoping that the reparations problem finally will be settled within a few weeks.

6. Agricultural prospects certainly are no worse than they were a year ago and in most sections they are better.

7. Manufacturers, wholesalers and retailers in most lines have guarded against over-extension and over-expansion and consequently are in a sound position.

8. Commodity prices generally are fairly firm although the trend is downward.

9. There has been relatively little over-production and neither manufacturers nor dealers have large stocks.

10. Labor is well employed and reasonably contented.

Prosperity depends, nevertheless, upon the willingness of the great mass of the people to buy the goods they need or want. There is a vast gulf between necessity and desire. An enormous volume of manufactured products is required to meet the actual needs of the American people, but when they are making purchases cautiously and only when they need to the sum total of their buying is not sufficient to bring a high degree of prosperity. Confidence begets prosperity but confidence must have its origin in the average home.

Basic Factors Favorable

All the economic factors involved are favorable to an indefinite continuation of the prosperity we have enjoyed for eighteen months, but even economics must be sidetracked when they run into mass psychology which sometimes manifests itself in the dreaded "buyers' strike." We have nothing as yet which resembles a buyers' strike, but the ingredients for one are ready for the mixing.

There are four adverse factors in the present situation, none of them fundamentally economic. They are:

1. The "propaganda of pessimism" which has been carried on by certain factions in Wall Street.

2. Delay by Congress in passing a constructive tax reduction bill and its apparent determination to grant a soldier bonus.

3. The graft and political scandals which are being aired in Washington.

4. The widespread notion that presidential years always bring a relapse in business.

Basic Conditions Sound

Taxation and the soldier bonus are the only ones of these factors which have a strong economic flavor, and uncertainty in regard to what will be done with them has made for hesitation in business. They are being used by Congress to give a marvelous exhibition of political tight rope walking and juggling.

So far as business is concerned the preaching of pessimism has been wholly unjustified upon any ground up to this time, at least. It was begun a year ago for purely selfish purposes and has been continued intermittently ever since. This propaganda has been so persistent, however, that it has gained many converts, especially among those who are not well informed. It probably has had more than anything else to do with undermining confidence on the part of the public.

When a large number of wage earners and salaried workers arrive simultaneously at the conclusion that large scale unemployment and consequently smaller earnings are impending, it is wholly natural that they should curtail their purchases so that they may have some resources with which to meet possible adversity. It is thus that buyers' strikes start, and if certain speculative interests have undermined confidence in the future without justification they must carry a heavy burden of responsibility.

So far as political skulduggery goes, it should have no bearing whatever upon the volume of trade, but it also has helped to destroy confidence in the servants the people have selected to represent them, and such a condition is peculiarly unfortunate in a year when a President will be elected.

It is perfectly plain that the positive points in the picture far outweigh the negative in relative importance, but it must not be forgotten that lack of confidence can roll up like a snowball. It is a form of panic and panic is the most contagious disease known to men.

Most panics are caused by baseless fears and, by the same token, if the American people suffer from a serious business depression in 1924 it will be their own fault.

There is only one really dangerous element in the situation and that is the "propagation of pessimism." If that can be curbed or rooted out we shall have little to fear. It behooves everyone with the best interests of the nation at heart, therefore, to start a counter fire by telling the truth and making it plain that there is nothing to get hysterical about. We don't mean the dissemination of blatant exaggeration and bunk. The facts are so favorable that all we need do is repeat them, time after time, until they are believed.

The calamity howlers make up a small minority, but they have remarkably good lungs. It should be easily possible, however, to raise a chorus loud enough to drown out their lamentations.

It isn't necessary to aver that business is going to be better than it was last year, for it won't be and it doesn't need to be to give us a substantial measure of prosperity. There was no unemployment last year. Wages were good and most people, with the exception of the farmers, were able to buy more of the things they wanted than they ever were before. If we can approximate those conditions this year, and there is no reason why we can't, we ought to be pretty well satisfied.

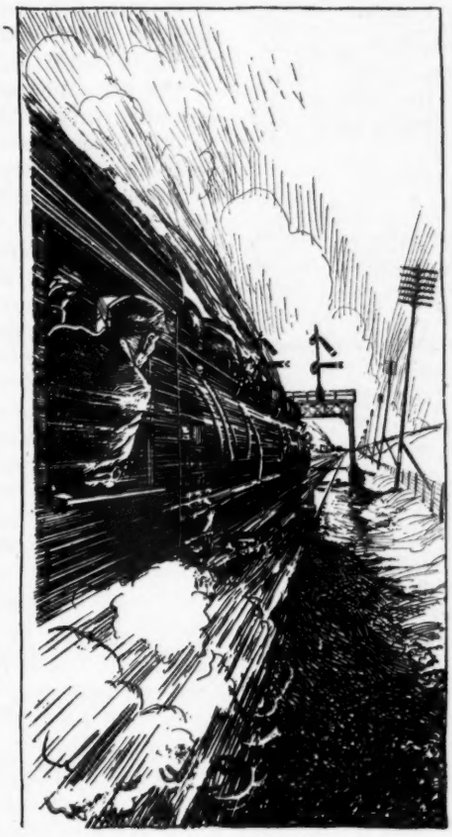
Chief evidences of the slowing tendency in business are:

1. A smaller volume of forward commitments.
2. Frequent repeat orders for small lots.
3. The downward tendency of wholesale and retail prices.
4. More "bargain sales" and somewhat reduced volume in retail stores.
5. A falling off in freight car loadings.

Probably the most significant of these is freight car loadings, because they reflect somewhat all the others. While the railroads of the country set a new record for the week ended March 15 by moving 916,953 cars, the figure was 12,552 less than for the preceding week and 28,066 less than for the week ended March 1. Loadings of merchandise showed a gain of 514 cars over the week ended March 8, but miscellaneous freight, which includes raw materials and manufactured products, declined by a total of 5941 cars.

But even when the freight car figures are used to indicate a slight hesitancy in trade, they demonstrate that the total volume of business is considerably larger than a year ago at this period. The week ended March 15 showed a gain of 12,837 over the corresponding week of 1923 and loadings were only 180,321 less than the record for all time, which was 1,097,274 in the last week of September, 1923.

Watching the Signals



The automotive track is clear but the signals must be watched carefully

While all the evidence available indicates the wisdom and even necessity of caution in business operations it shows equally well that nothing alarming has happened.

It is quite as probable that the hesitancy now apparent will vanish as that it will increase. There is no likelihood whatever of a precipitate decline. Even if the volume of business continues to contract, the process will be so gradual it will be almost imperceptible from week to week and we shall have had a very respectable, not to say substantial, year's trade.

Total Business Volume Large

While the automotive industry undoubtedly will have a big business, as measured by the returns of other years, manufacturers in that field should watch carefully the four big Cs—Cash, Credits, Collections and Commitments. If these factors are given proper consideration there will be nothing to fear. It will be virtually impossible to build up large and unbalanced inventories, unwieldy stocks of finished products and additional factory space.

Caution is just as essential for parts and accessory makers as for vehicle producers. Fortunately, there seems no disposition whatever to take needless risks. The industry is in better position than it ever was before to meet any kind of an emergency. Notwithstanding the enormous volume of business it has done in the past two years it never has lost its sanity. That is best evidenced by the fact that its commitments seldom have run more than 60 days ahead.

Most companies are in a strong cash position and not only are conserving their resources but are keeping them liquid. The very fact that passenger car manufacturers curtailed operations promptly when it became apparent that production was running ahead of demand demonstrates that they are taking no chances.

While caution always is advisable in business, care should be taken to see that it does not degenerate into cowardice. Nothing has happened and nothing is likely to happen which need frighten the automotive industry. The bottom hasn't dropped out of sales and it won't unless the confidence of the general public in the outlook for the future is undermined much more rapidly than now seems probable.

Normal Sales This Year

Those who still cling to the idea that sales of motor vehicles this year will be larger than they were last might as well get the idea out of their heads now as later, however. Cities and industrial districts will be hit hardest by whatever decline there may be in business, and these are the areas which have bought motor cars most heavily in the past two years. Farm demand, on the other hand, has been subnormal and it is not likely to be much greater in 1924, at least until the latter part of the year. It is fairly obvious, therefore, that increased sales are scarcely to be expected.

The readjustment process which followed the war has not been completed and cannot be completed until there is a greater degree of equalization between the prices of farm products and the prices of products used on the farm. Whatever contraction there may be in the volume of trade probably will hasten this process and if it does it will be a blessing in disguise, because there can be no complete, long continued prosperity in this country until the purchasing power of the farmers and the purchasing power of the rest of the population are on a more equitable basis. Theoretically, the farmers have half the buying capacity of the country, but actually they haven't had it for the past four years.

Equalized Demand Desirable

While farm demand for automobiles has been subnormal, city demand has been abnormal, and the sooner the two are equalized the better it will be for the industry. Then we shall be able to determine with some degree of accuracy what constitutes a normal year's demand, which we haven't been able to do up to this time.

We do not propose to predict what motor vehicle sales will aggregate this year, but under even the most unfavorable conditions they will be very large and no well-managed, conservatively conducted company need suffer seriously.

It will not be surprising if the coming of spring revivifies demand and brings sales back to the proportions which have prevailed for months, because, as we have said, there is no real basis for a general lack of confidence in the outlook for the rest of this year.

The need for caution will persist, however, for there will remain a good many uncertainties, not the least of which will be the discrepancy between farm and city prices, which must be remedied sooner or later.

New Air Compressors for Braking Require No Automatic Clutch

THE Westinghouse Air Brake Co. has developed a new type of air compressor for use on automotive vehicles to supply air for the air brake system as well as for auxiliary purposes such as inflating tires, etc. Two sizes are now available, one having a displacement of 3 cu. ft. per minute and the other 6 cu. ft.

This compressor is of the duplex, single-acting high-speed type and is driven direct from one of the auxiliary power shafts on the engine, or through belt, chain or gears. It is designed for operation at 75 lb. air pressure continuously, and at higher pressure for short periods.

No automatic governor is required to start and stop the compressor; it operates continuously, while the engine is running, the pressure in the storage reservoir being normally prevented from rising above 75 lb. by a pressure regulator which permits the excess pressure to discharge to the atmosphere. But if it is desired to inflate tires, and this surplus air is permitted to discharge into the tires, the pressure builds up to 100 lb. or whatever the desired tire inflation is, the compressor being able to operate against a pressure as high as 150 lb. for a short time if necessary.

The compressor inlet valves, of the rotary type, are mechanically operated, being gear-driven from the crankshaft. This insures a very high volumetric efficiency for the compressor regardless of operating speed.

The discharge valves are of the inverted mushroom type, spring-loaded.

All bearings are lubricated by forced oil feed from a gear type oil pump in the compressor crankcase. The cylinder walls are lubricated by oil thrown off by the rotating parts. The bottom of the crankcase forms an oil reservoir which may be manually refilled, or it may be automatically supplied from the oiling system of the engine.

Design Is Light and Compact

It is claimed for these compressors that they are compact, light, quiet-running and highly efficient, and that they consume very little power. The 3 cu. ft. size weighs 18 lb. and has overall dimensions of 5½ in. (width) by 9½ in. by 9½ in. At the normal speed of 1250 r.p.m. it requires less than ¾ hp. to drive the compressor. The 6 cu. ft. size weighs 28 lb. and has overall dimensions of 6½ in. (width) by 12¼ in. (length) by 10⅝ in. (height). This size consumes 1 hp. under normal operating conditions.

The smaller compressor is being used on buses and on heavy truck and trailer units, while the larger is finding a field of application on gasoline-driven railcars.

ACCORDING to an article in a German metallurgical paper, good results have been obtained by using chromium instead of nickel as a plating material to insure protection against oxidation of ferrous metals. By the use of certain chromium salts it was found possible to obtain on iron and other metals two different kinds of adhesive coatings. One is similar in appearance to nickel when polished, while the other is of grayish granular appearance and if deposited to a considerable depth forms a layer of a steely nature. The latter method of plating is said to be superior to the other in every respect, the electrical efficiency being higher, and the adherence and the depth of penetration greater. Tubes "chromed" in this way are said to have proven exceedingly resistant to corrosion.

New Principle Embodied in Baechler Heavy Fuel Unit

Exceptionally energetic atomization is provided. Water is added to the mixture and fuel is emulsified with it. Prevents detonation at compression pressures which are normally used.

A NEW principle in the preparation of heavy fuel combustible mixtures is said to be embodied in the Baechler "heavy fuel unit" recently developed in Germany. Recognizing the difficulties which have been encountered in the utilization of kerosene and similar heavy fuels, Baechler provides for exceptionally energetic atomization and for the addition of water to the mixture and emulsification of the fuel with it, with the object of preventing detonation at compression pressures such as normally used with the more volatile fuels. Another feature of the system is that suction on the fuel at the mouth of the spray nozzle is practically independent of the rate of mixture flow and therefore is no weaker when the engine is strongly throttled than when it is running wide open.

A sectional view of the carbureter, redrawn from *Der Motorwagen*, is shown herewith. It will be noticed that there are two float chambers, on opposite sides of the central mixing chamber. The engine is started on light fuel and after having run on the latter for several minutes and attained its normal working temperature, is switched over to the heavy fuel.

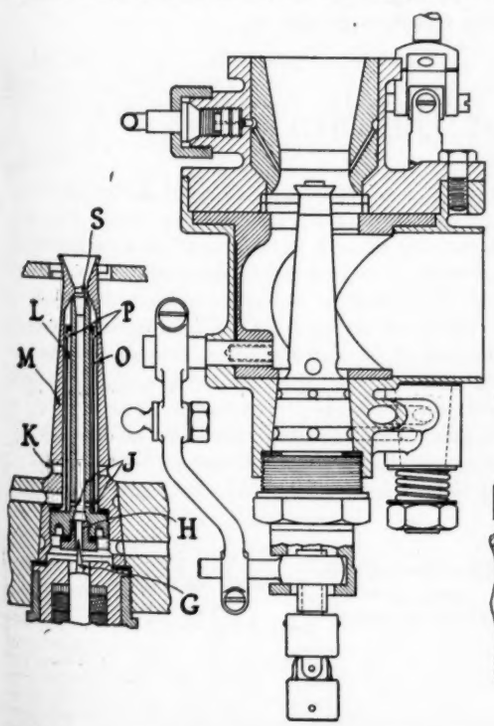
Referring to the sectional view of the complete instrument and to the detail view of the spray nozzle, the fuel flows through the passages *A, B, C, D* to the metering orifice *H*, the cross section of which varies constantly in accordance with the opening of the Iris type of throttle *X* surrounding the head of the multiplier nozzle. From the metering orifice the fuel passes to the fuel standpipe *L*, the cross section of which is materially greater than that of the metering orifice. This fuel standpipe, which must be made of a certain height in order to attain the desired advantages, has a funnel-shaped enlargement at its upper end. The arrangement of the fuel metering orifice and of the fuel standpipe is such as to give a very low rate of fuel flow from the mouth of the standpipe or what may be regarded as the spray nozzle.

Nozzle Multiplies Air Velocity

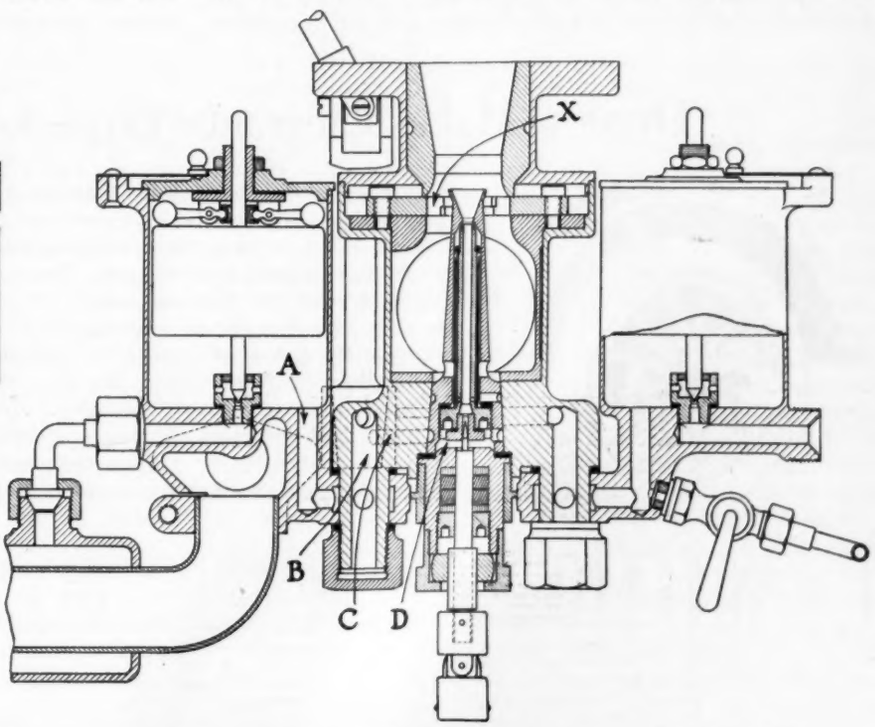
In addition to being funnel-shaped at the upper end, the fuel standpipe is also beveled off, so that there results a sharp circular edge at *S*. The fuel standpipe *L* is surrounded by the multiplying nozzle *M*, which derives its name from the fact that it multiplies the velocity of the air flowing through it at a point directly above the point of delivery of the fuel standpipe *L*.

Air from the carbureter air inlet enters the multiplying nozzle *M* through the drill holes *K* and passes up this nozzle without meeting any appreciable resistance, hence without dropping much in pressure below atmospheric. Near the top of the fuel standpipe the cross section of the multiplying nozzle decreases gradually, attaining its minimum section directly above the top of the standpipe.

The air velocity is further increased by the fact that beyond the fuel standpipe the multiplying nozzle assumes an inverted conical form, the two cones together forming



Sectional views of Baechler heavy fuel carbureter



Detail of metering orifice, stray nozzle and multiplier tube

a venturi, and that the top edge of the nozzle is located at the point of greatest constriction of the main air passage, where there is always a considerable degree of vacuum. This insures that the air when passing through the multiplyer nozzle at the top of the fuel standpipe always has a very high speed, irrespective of the throttle position.

Suction Similar for All Throttle Openings

Owing to the concentric closing and opening motion of the throttle valve at the top of the multiplier nozzle the suction on the fuel standpipe and the multiplier nozzle remains the same for all throttle openings. For idling, the throttle is brought close up around the multiplier nozzle, so that practically all of the air has to pass through the multiplier nozzle, that is, through the annular passage *S*.

If the throttle is slightly opened, an additional annular air opening will be formed outside the multiplier nozzle, and the atomizing action is then as follows: The fuel in the fuel standpipe and especially near the top of same is almost at rest or, in any case, has only a very low upward speed, and the air passing through the annular opening *S* at high speed picks off the fuel from the sharp edge of the standpipe *L*. The direction of the air stream through the cross section *L* is said to be such as to produce further atomization through vortex action. There is a further atomizing action at the top of the multiplier nozzle where the air entering through the throttle enters the mixture coming up through the passage *S*.

To facilitate the fuel metering process through the metering orifice *H* and the metering valve *G*, the fuel standpipe is surrounded by a jacket *O*, which permits of the bleeding of the fuel standpipe through the openings *P* and *J*.

Every effort has been made to secure very energetic atomization of the heavy fuel, but it is realized that this alone would not solve the problem of the efficient use of heavy fuels in the engine. The chief difficulty encountered would be a severe fuel knock. In the past it has been sought to overcome this either by the use of very low compression, which is objectionable because of the detrimental effect on the engine power and fuel economy, or by the addition of water to the prepared fuel mixture. The objection to the latter practice is said to be that it is entirely impossible for the water when thus added to form a homogeneous mixture with the fuel charge.

A water feed nozzle is arranged in the air inlet to the carbureter, and the water dripping through it enters through the openings *K* into the multiplier nozzle, so it is no longer air but a mixture of air and water vapor that "wears" the fuel particles from the sharp edge of the fuel standpipe. It is claimed that in this way a regular emulsion is formed and that the fuel particles which are responsible for the knocking are chemically bound by the water vapor. This is said to be proved by the fact that only a very small proportion of water is required to stop knocking, from 1 to 2 per cent in the case of lignite tar oils and about 3 per cent in the case of heavy mineral oils.

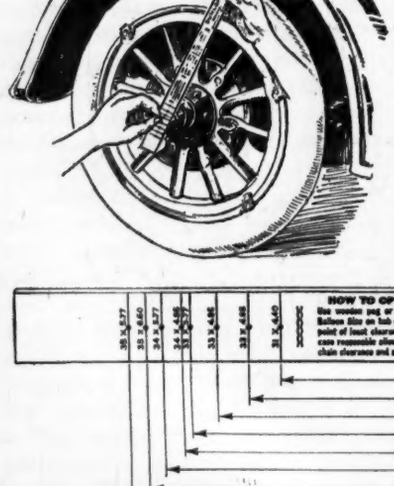
In this construction the throttle is mechanically connected to the fuel metering valve, so that as the throttle is closed the metering orifice section is reduced. The heavy fuel is preheated by being passed through a jacket on a branch to the exhaust pipe which carries exhaust gas to a heating chamber at the bottom of the heavy fuel float chamber.

Varying Richness of Fuel Mixture

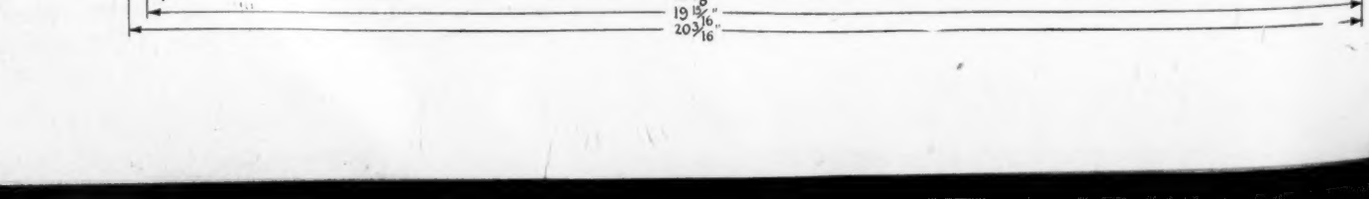
Provision is made for varying the richness of the fuel mixture within certain limits from the driver's seat. This not only facilitates adjustment of the device but also permits a considerable saving in fuel under conditions when the whole power of the engine is not required, as in driving on the level. Then, when a hill or heavy going is encountered, the driver can slightly increase the size of the fuel metering orifice and so obtain the maximum engine output.

A special starting nozzle is provided, but this is said to be required only in case it is desired to operate on exceedingly heavy fuels, since the suction at the main fuel nozzle does not decrease with closing of the throttle valve. This starting nozzle delivers into the venturi at its most constricted section, in a direction almost opposite that of the air stream through it, in consequence of which a strong atomizing effect is produced.

Dunlop Makes Clearance Gage for Balloon Tires



A simple gage for determining whether any car has sufficient clearance for replacement balloon tires has been brought out by the Dunlop Tire & Rubber Co. of Buffalo, N. Y. As seen in the accompanying cut, the gage is simply a stick with holes at certain distances from the end. These distances correspond to the radius of what may be termed the clearance circle. A nail is placed in the hole corresponding to the size of the tire the car requires and the point of the nail then is held against the center of the hub of the wheel. If then the end of the gage in swinging around the nail strikes the fender above the tire, the clearance is inadequate, but if it does not touch, there is adequate clearance. Allowance is made for chains in figuring the clearance and designing the gage. Measurements presumably should be made with maximum load in the car. Since the gage cannot be used in the plane of the wheel, it is necessary to sight across the end of the stick in making the measurements



Research Reveals Properties of Steels Used for Gages

Investigations carried on at Bureau of Standards throw light on the wear characteristics of different steels, hardened and unhardened; the relative changes in size on hardening in oil and water; and the factors which affect time changes in gages.

IN the manufacture and use of gages in the production of interchangeable machine parts a number of difficulties are encountered which became especially pronounced during the war when the use of these devices increased rapidly. There are three outstanding problems confronting the manufacturers of gages, as follows: To increase wear resistance; to reduce dimensional changes on hardening and to eliminate length changes with time.

Shortly after the war the Ordnance Department interested makers and users of gages and makers of gage steels in cooperative effort to find means to improve the quality of steel gages, and as a result the Gage Steel Committee was formed early in 1922. Much experimental work has been carried out for the committee at the Bureau of Standards and a summary of the results obtained to date is given in the following, which is taken from the Ninth Progress Report of the Committee.

The experimental work has been practically confined to commercial steels. Attention has been focused on chrome bearing-steel, which is highly recommended by several gage makers and on which the Ordnance Department has initiated service tests.

An Amsler wear testing machine was available at the Bureau of Standards and experiments were started to determine the suitability of this machine for measuring the relative wear resistance of tool steels. The machine produces wear on the peripheral faces of two disks revolving at different speeds under constant load and without lubrication. The wear is measured by the loss in weight of the specimens after a given number of revolutions. The results are reproducible. Some abrasive is present, since particles detached adhere to the contact surfaces. When the specimens are kept free from abraded particles by light brushing, the rate of wear is very materially decreased.

Results of Tests Without Brushing

The results of tests without brushing have shown that a chrome bearing steel and a non-deforming steel hardened and tempered between 275 and 300 deg. C. have a greater resistance to wear against the same material untempered than have the untempered specimens. Chilled cast iron and stellite are less resistant to such wear against hardened steels of the above composition than the steel. This observation is not compatible with the results of certain types of service wear on these metals. The above surprising results indicate the need for methods of wear testing which more closely simulate actual working conditions and which will give reproducible results in a reasonable time. Any such results should be checked by comparative service tests. Until a more reliable test method is developed, some of the large users of gages can be of assistance by testing representative samples under actual service conditions and in comparison with present products.

Ordnance Department Investigation

The Ordnance Department initiated a service test shortly after the organization of this committee. Thread gages were made of the chrome bearing steel, given a specified heat treatment and put into service. To date they have gaged over double the number of pieces previously gaged within the life of a carbon steel gage and with a loss of only half the tolerance. The chrome steel is not file hard. That a steel which is not file hard wore less than a steel presumably file hard raises a question as to the degree of hardness which will best resist wear under definite conditions. The best degree of hardness will probably be found to vary with the composition of the steel. To answer the pertinent questions raised by the above experiments, plug gages of several compositions and treatments will be put into severe service as soon as possible and the results compared with laboratory tests.

The committee's experience questions the generally accepted opinion that extreme hardness is necessary for best resistance to wear. It is believed that there is some relation between wear and hardness, which probably varies with different steels. Whether or not such a relation exists, hardness is a useful test of the efficacy and uniformity of a heat treatment. Studies were therefore made of the relations between the composition and the major variables of the heat treatment of tool steel and its hardness. The Rockwell diamond cone hardness test was used because of its sensitivity to small differences in extreme hardness. Six steels of about 1 per cent carbon content, but varying widely in alloy content, were hardened from appropriate temperatures. Tempered at 150 deg. C., the hardness values did not differ between specimens by more than 1 per cent. For higher and lower tempering temperatures there were marked differences in hardness. It is hardly conceivable that the different steels tempered at 150 deg. C. do not differ in resistance to wear, so it is probable that the hardness test, like the file test, is not a reliable criterion of wearing quality.

The effect of the several variables of hardening on the hardness is notable. Increasing the quenching temperature increases the hardness and it is maintained well on tempering at 150 deg. C. or higher. As high a hardness can be obtained with a low quenching tempera-

ture by rehardening, but it drops more rapidly on tempering than that produced by a high quenching temperature. The hardness obtained by rehardening is, however, more uniform than that produced by a single quench, particularly on oil quenching. Increasing the cooling rate above that necessary to produce uniform hardening increases the hardness, but the advantage is slight and rapidly lost on tempering. Varying the cooling rate below 300 deg. C. within wide limits has little effect on the hardness. These results indicate the variables that it is possible to regulate without materially affecting the constitution required for a given wear quality. They alone can be used to control dimensional and time changes.

Dimensional Changes After Hardening

For the determination of dimensional changes on hardening and with time, standard cylindrical specimens 1 in. diameter and 4 in. long were used. Measurements of length, diameter and density before and after hardening showed invariably an increase in volume on hardening. This volume change is roughly proportional to the percentage of metal hardening and for full-hardening tool steels amounts to about 0.6 per cent. The volume change is directly associated with hardening and cannot be avoided. The degree of expansion can be reduced by hardening the surface layers only, but this practice introduces undesirable effects. The direction of the movement can, however, be controlled to some extent. Thus the full-hardening steels in the above sizes change more in unit length than in diameter with low quenching temperatures, while the reverse is true with high quenching temperatures. The change is less on oil quenching than on water quenching. A typical non-shrinking steel has a marked tendency to change more in unit diameter than in length, even with a low quenching temperature, and when properly tempered returns to very near its original length, although its diameter is then greater than the original. Low alloy steels, which harden on the surfaces only, generally shrink longitudinally and expand radially.

Measurements Before and After Heat Treatment

The hardened steels invariably shrink on tempering below about 200 deg. C. They generally expand from the dimensions at 200 deg. C. on tempering up to about 250 deg. C. and sometimes to a volume greater than as hardened. On tempering above 250 deg. C., they shrink continuously up to the critical point. In the fully hardened steels the unit changes on tempering are the same in length and diameter. The shrinkage in length on tempering below 200 deg. C. is consequently insufficient to compensate for the expansion on hardening except when the hardening change is largely in diameter. Length and diameter measurements are made before and after each heat treatment as a matter of routine, and offer an excellent check on the heat treatment.

To locate the source of the dimensional changes of hardening, a high-nickel steel, which has no hardening transformation above room temperatures, was quenched in water. No dimensional change or distortion was found. The dimensional changes are then associated with the hardening transformation which occurs in tool steels near the end of the quench, i.e., below 300 deg. C. This was verified by quenching an oil-hardening steel in oil, withdrawing before the transformation was reached and cooling in air. The subsequent length changes were followed with a mechanical indiciator. The length change through the transformation was two or three times the net change from original to final length. The change was greater the higher the quenching temperature. These observations indicate the possibility of controlling the internal stress relations by means of the cooling during the latter part of the quench. The value of so doing is obvious. The hardness tests indicate that no marked variations in constitution are produced by this expedient. Therefore, it is not believed that the wearing qualities would be affected.

An analysis of the factors which may influence the length changes of steel gages with time lead to the conclusion that there are two dominant factors involved, namely, internal stress and constitutional changes. If the observed time changes are caused by two distinct phenomena, it is necessary to examine each separately in order to arrive at a method of controlling them. Following this lead, the internal stress was studied experimentally by the method of grinding peripheral layers off the standard cylinders and measuring the resulting length changes. The approximate longitudinal stress was computed from the length change values.

Effect of Water Quenching

Water quenched chrome bearing-steel specimens were in compression at the surface and in tension near the center. Tempering reduced the stress rapidly, but did not eliminate it. The intensity of the stress developed by straight oil quenching was generally low. High tensional stress at the surface was obtained by limited quenching in oil and cooling through the hardening transformation in air. Maximum stress was always developed at the surface of the full-hardening steels. The low alloy steel, which harden at the surface only, were under very high compression at the surface and equally high tension at the center.

The problem of controlling the internal stress introduced the problem of temperature distribution during quenching, which is obviously the factor controlling the stress relations. This led to an experimental determination of cooling rates in the important quenching media and the evaluation of cooling constants. A mathematical analysis of the cooling of cylinders developed simple expressions for the temperature relations. With the experimental cooling constants and the mathematical expressions, the temperature relations in simple shapes for commercial hardening operations can be estimated. In consideration of the large gap between the cooling power of water and of oil, the quenching rates of glycerin-water solutions were also determined. These solutions gave cooling rates within the above limits.

Time Changes of Untempered Specimens

The stress effects are strikingly reflected in the time changes of untempered specimens. The surface hardened steels show the largest change, a shrinkage. The time changes increase very rapidly with rising quenching temperature. They are less for oil than for water quenching. The specimens under tensional surface stress all expand for a month or two and then shrink at about the same rate as a steel under surface compression. The changes are greatly reduced by tempering. For low tempering temperatures the direction is the same as when untempered.

From these results it appears that the stress effects disappear after a few months, but the constitutional changes continue for an indefinite time. Some gages which have been under observation for years have expanded while others have contracted. The problem of time changes is then to find the factors controlling the direction of the changes over long periods. Experiments in this direction are under way.

Maxwell Practice Illustrates a New Method of Engine Mounting

Vibration is reduced. At rear powerplant has swivel support on frame about which it is free to move, since it is not secured rigidly at forward end.

By P. M. Heldt

FOR some time a novel powerplant mounting has been employed on the Maxwell car, by means of which transmission of engine vibration to the chassis frame is to a large extent prevented. An illustration of the forward support of the engine on a transverse, half-elliptic spring was shown in these columns some months ago, and at the same time the method of mounting, which is due to L. C. Freeman, formerly an engineer with the Maxwell Motor Co., was briefly described. Up to recently it was impossible to get particulars regarding the principles underlying the mounting, owing to the state of patent proceedings, but we now can give an explanation of how the suspension helps to minimize unpleasant chassis vibration.

At the rear the powerplant has a swivel support on the frame, and not being rigidly secured to the frame at the forward end but supported freely on the spring, it is free to move axially around the rear support. The powerplant, of course, is subject to the action of the unbalanced secondary inertia force, which is an harmonic force acting in a vertical direction in a line midway between the axes of cylinders Nos. 2 and 3.

This unbalanced periodic force will set up vibrations of the powerplant and the problem is to insulate the car frame against these vibrations as much as possible. The vibrations could be transmitted to the frame only through the points of support, and in order to prevent this the supports must be located at points of no reaction, if possible. The powerplant, by reason of its mounting, forms an oscillating body and in order that there may no reaction at the axis of oscillation, the force producing the oscillations must be applied at what is known as its center of percussion.

Effects of Impulsive Forces

If a freely supported body is given an impulse in a line through its center of gravity, it will be moved in the direction of the impulse, as indicated in Fig. 1. The center of percussion then coincides with the center of gravity. On the other hand, if a body of this kind is given an impulse at one end, as indicated in Fig. 2, it will be caused to gyrate around its center of percussion. This can be nicely illustrated by placing a pencil on the table and "shooting" one end with the forefinger. Of course, in addition to the gyratory motion a motion of translation will be imparted to the pencil; to give it a pure gyratory motion it is necessary to apply a couple to it, as by "shooting" at both ends at the same time and so as to produce equal impacts.

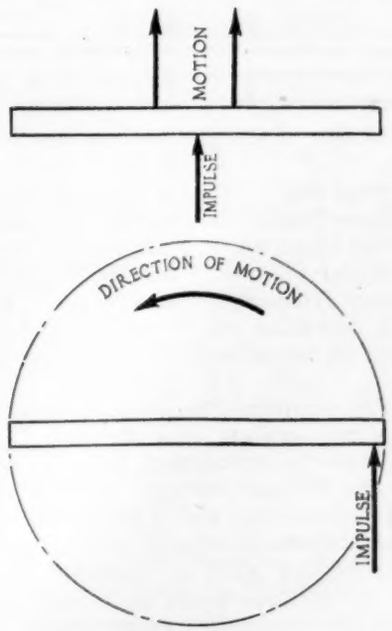
When the impulse is applied at the center of gravity and a motion of translation results, the body may be considered to be rotating around an axis at an infinite distance, and by moving the point of application from the center to the end, the length of the radius of rotation has been decreased from infinity to half the length of the body. It is obvious from this that if the impulse be applied somewhere between the center and one end of the body, the latter will be given an angular motion around an axis at a finite distance from this end greater than half the length of the body. If the impulse is imparted not at the very end of the body but a short distance in from the end, the axis of rotation will be simply moved farther away from that end.

Supposing the axis of angular motion to be within the length of the body, if the latter were supported on this axis there naturally would be no reaction on the supports to the force or impulse causing the motion.

Application to Powerplant Support

In the case of the powerplant the point of application of the impulse is fixed, and in order to eliminate reaction on the swivel supports these must be placed on the axis around which the powerplant tends to rotate under the influence of the impulse.

A somewhat similar problem is encountered in building construction in the location of door stops. When a door is slammed open against the stop its whole kinetic energy is suddenly absorbed. At this moment it connects with the rigid structure of the building through the door stop



Figs. 1 *and* 2

and through the hinges, and if the stop were carelessly located a great deal of strain would come on the hinges and they soon would show the effect of such treatment. Ey placing the door stops so far out from the hinges that the kinetic energies of the parts of the door closer in toward and farther out from the hinges than the

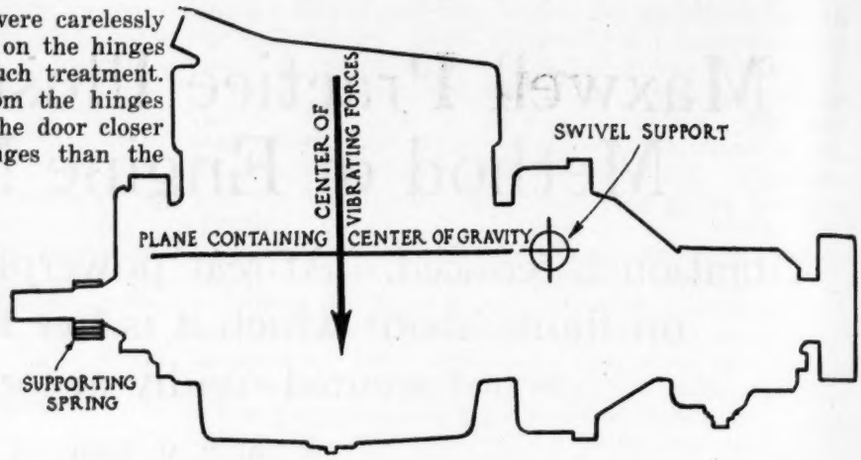


Fig. 4 — Diagram of powerplant showing line of action of unbalanced forces and location of supporting points

stop, are equal, the full force of the impact comes on the stop and the hinges are relieved (Fig. 3).

The powerplant represents an inverse case to that of the door, in that the point of application of the impulse is fixed and the rear supports have to be located on the axis around which the mass of the powerplant will turn under the influence of the impulses. The distance between the line of action of the unbalanced force (midway between the axes of cylinders Nos. 2 and 3) and the proper axis of the rear supports is equal to the least radius of gyration of the powerplant, which can be determined as follows:

The powerplant is supported between fixtures so that it can rock around an axis determined by the intersection of a horizontal plane through its center of gravity and a vertical plane perpendicular to its crankshaft and containing the line of action of the unbalanced forces. The powerplant is then oscillated around this axis and the time of one complete oscillation is ascertained. From the formula for the length of the single pendulum

$$l = \frac{g\,t^2}{\pi^2}$$

the length of such a pendulum having the same period of oscillation is then ascertained, and this fixes the proper location of the axis of the rear swivel support.

Complete elimination of reaction on the supports is rendered impossible, however, by the fact that the forward end of the powerplant must be supported on the

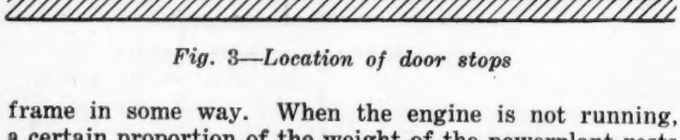


Fig. 3—Location of door stops

frame in some way. When the engine is not running, a certain proportion of the weight of the powerplant rests on the spring, equal to the proportion of the distance between the center of gravity and rear support to the distance between front and rear supports. But when the engine is in operation and the unbalanced force is effective, the load on the spring will soon be greater and soon less.

The flexibly supported powerplant, of course, will be subjected to two entirely separate forces tending to set it in vibration—the unbalanced force of the engine and the forces due to road shocks. When the front wheels pass over an obstruction the front end of the powerplant will be thrown upward and will be set into vibration of a frequency depending upon the moment of inertia of the powerplant around the axis of its rear supports and upon the stiffness of the spring supporting it at the front.

Vibration due to the unbalanced force of the engine will be superimposed upon this free vibration. The former is entirely forced, its period being directly dependent only on the speed of the engine and at ordinary engine speeds very much shorter than that of the free vibration. At 1500 r.p.m. of the engine, for instance, the secondary unbalanced force acts in one direction only for one-hundredth of a second and the displacement produced by it during this time is exceedingly minute.

Since the powerplant is swiveled on the rear supports, the unbalanced force causes an angular acceleration around the axis of this support. The equation for angular acceleration is

$$a_a = \frac{M\,g}{W\,r^2} \text{ radians per second per second,}$$

where M is the moment of the force producing the acceleration; g, the acceleration of gravity (32.16); W, the weight of the swiveled mass, and r, its radius of gyration around the axis of the rear supports.

Amplitude of Engine Vibration

If we take, for example, a four-cylinder engine of about 3¾ in. bore, the maximum value of the secondary unbalanced force at 1500 r.p.m. for all four pistons will be in the neighborhood of 800 lb. All four must be added together, because when the pistons are at the ends of their strokes the secondary unbalanced forces are all in the same direction. The force varies according to a sine curve, and, as the average height of the sine curve is 0.637 times its maximum height, the average value of the unbalanced force will be

$$0.637 \times 800 = 510 \text{ lb.}$$

We may assume that the center of the engine, where this force acts, is at a distance of one foot from the axis of the rear support, in which case the average moment of the force during the time it persists is 510 lb.-ft. The radius of gyration we may assume to be 1.25 ft., and the weight of the powerplant 350 lb. Then the acceleration due to this moment will be

$$\frac{510 \times 32.16}{350 \times 1.25 \times 1.25} = 0.3 \text{ radians p.s.p.s.}$$

The formula for the angular distance described during a time t under a constant angular acceleration a is

$$l = \frac{a\,t^2}{2}$$

In this case the angular distance amounts to

$$\frac{0.3 \times 1/100 \times 1/100}{2} = 0.00015 \text{ radians.}$$

If the distance between the centers of the front and rear supports is 26 in. the forward end of the powerplant will be thrown up

$$0.00015 \times 26 = 0.0039 \text{ in.}$$

twice during each revolution of the engine.

This calculation, while not applying to any particular

engine, gives an idea of the magnitudes involved. The change in pressure of the spring when compressed about 0.004 in. is insignificant, hence the unbalanced force of the engine is resisted almost entirely by the inertia of the mass of the powerplant.

Two questions arise in this connection, namely, whether it is better to use a stiff or a light, flexible spring and whether a spring damper or frictional shock absorber would have a beneficial effect.

Flexibility and Damping Action

It is obvious from the above that, since under the impulses of the secondary force the forward end of the powerplant will be thrown up and down a certain distance during each half crankshaft revolution, the greater the flexibility of the spring, the less will be the change in its pressure on the frame, and hence the smaller the vibrating force that will be transmitted from the forward end of the engine to the frame. However, any reasonable differences in spring flexibility would have very little influence on the transmission of vibrating forces.

Frictional damping forces have a more important influence in this respect. Suppose that there was a spring damper of the frictional type between the frame and the powerplant at the forward end, adjacent to the supporting spring, and that this damper was set so it required a certain force to start its members moving relative to each other. The unbalanced force which causes the vibration starts from zero and increases to a maximum, and until it became large enough to overcome the frictional force of the spring damper it would be transmitted to the frame the same as if the powerplant were rigidly mounted. Therefore, damping of the supporting spring, whether by means of an outside device or by the use of a multiplicity of leaves, is detrimental.

Practically everyone who has ever ridden in a four-cylinder car has noticed a very perceptible vibration at a certain car speed, usually between 25 and 30 m.p.h., at which speed the car is said to have a "period." The very fact that this vibration is limited to a very narrow range in car speeds, and hence in engine revolutions, shows that it is due to synchronism between the engine speed (or some harmonic thereof) and the natural period of vibration of the part of the car affected.

The periodicity of the secondary unbalanced force at the car speed mentioned is very high. For instance, assuming 31 in. tires and a rear axle reduction of 4.5 to 1, at 30 m.p.h. the engine will turn over at 1460 r.p.m., which corresponds to 2920 complete cycles of the secondary unbalanced force per minute. The forward end of the chassis has a natural period of swing around the rear axle, but this is of the order of 100 cycles per minute or less, hence there is no possibility of synchronism between these impulses and vibration around the rear axle.

Nature of Chassis Vibration

Since the natural period of vibration of a flexible body is directly proportional to the square root of the vibrating mass and inversely proportional to the square root of the restoring force, it follows that a body vibrating freely at such a high rate as 3000 cycles per minute must either be very light or have a strong restoring force; that is, be very stiff. It seems that what actually vibrates when the car acts in the manner described is the frame, and that the vibration is not an up and down movement of the frame as a whole but an elastic vibration similar to that of the bottom of a dishpan if tapped at the center.

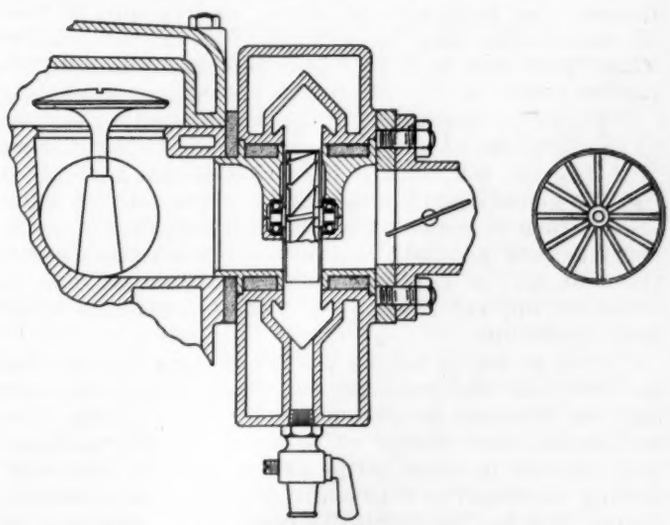
The reciprocating force on the engine is transmitted to the frame cross members serving as engine bearers, and owing to the inertia of the side members these cross members are elastically bent back and forth. From the cross members some of the force is transmitted to the side members and these also are bent back and forth. A sort of whipping action results, the corners of the frame tending to lag behind the points where the vibrating force is transferred from the engine to the car frame.

A chassis frame undoubtedly has a certain natural period of elastic vibration, determined, on the one hand, by its own weight and the weight of parts rigidly secured to it, and, on the other, by its stiffness. While the unbalanced force of the engine is upward, the engine frame will be thrown upward and the engine bearers and frame side members will be deflected. Then, when the unbalanced force changes direction, the engine bearers and frame side members tend to straighten out again, throwing the engine down and the ends of the chassis frame side members up. If this action continues just as long as the downward action of the unbalanced force in the engine, then there will be synchronism, and succeeding impulses will add to the amplitude of the vibration.

Methods of Eliminating Vibration

There are evidently two methods available for reducing the vibration of four-cylinder cars. One consists in insulating the powerplant from the chassis so that the former can vibrate independently of the latter through a small range. This is the object aimed at in the Maxwell mounting described in the foregoing. It is obvious that mounting the powerplant on flexible supports, such as rubber cushions, would produce a similar effect. The other method referred to consists in making the frame assembly stiffer so as to bring the speed of synchronism outside the range of normal operation. Owing to the fact that the rate of free natural vibration increases only as the square root of the stiffness (measured in pounds per unit of deflection), it is rather difficult to change the speed of synchronism very much by this method. Supporting the powerplant by truss-form cross members secured between the flanges of the bell housing and of the front end drive housing evidently would help, and trussing the frame side members should add further to the stiffness of the frame and decrease its natural period.

New Device Separates Fuel Particles



Device built by C. E. Sargent for separating the unvaporized particles of fuel from the mixture entering the engine, by throwing it by centrifugal force into an annular space surrounding the inlet passage and which in turn is surrounded by an exhaust jacket

Road Construction Should Permit Higher Average Traffic Speed

Arrangement of highway has much to do with economics of its use. Improvements designed to eliminate unnecessary stops are justified easily by savings in time, fuel, and other items.

By Herbert Chase

ENORMOUS sums are being spent in nearly all localities for the building of new roads and the widening or improvement of others, but these funds are not always applied to the best economic advantage of the communities involved.

This is due quite largely to a lamentable disregard of numerous factors which directly and indirectly affect the capacity and cost of using the highway. Such matters too often are left in the hands of persons who consider only such items as the character of pavement and the methods used in building the road, without thought concerning the effect on traffic of intersecting highways at grade, waste of time and fuel due to unnecessary stops, excessive cost of traffic regulation, increased liability to accidents, and the like.

Width is by no means the only factor which controls the volume of traffic a highway can carry. A comparatively narrow road can be built to carry just as much traffic as one twice as wide, for example, if the former is so constructed as to enable a continuous flow while the latter is built in such fashion that stops are necessarily so frequent, because of cross traffic, that the average speed of the vehicles which pass over it is half that of the vehicles on the narrow road.

It may be doubted, at first thought, whether matters of this kind are of any great significance to the automotive industry, but when it is considered that inability to use automobiles and trucks profitably and without undue loss of time is becoming a serious handicap to sales in many densely populated sections, it is seen at once that the industry is vitally interested and should use its influence through dealer and other channels to better such conditions.

It is no secret among dealers in such communities as New York that many persons who formerly used their cars for business as well as pleasure are giving them up because they cannot be used economically and conveniently for business purposes and because "pleasure" driving no longer is a pleasure when one has always to operate the car in a traffic stream with frequently repeated starting and stopping for miles out of and into the city.

W. S. James of the Bureau of Standards recently drew attention to the fact that the cost of gasoline alone required to accelerate the cars in a traffic stream, such as that on Fifth Avenue, from rest to a speed of 25 m.p.h., might approximate $150,000 a year, or the interest on an investment of $3,000,000. In addition to this there is the loss of fuel in idling during stops, the wear on brakes, and, of far greater significance, the enormous loss in time of the millions of passengers and drivers involved.

Although the stream of traffic on Fifth Avenue is more dense and of greater average volume than that on most other highways within and leading out of the city, the stream is much shorter than that which exists on many other thoroughfares at certain times each week. On Saturdays and Sundays particularly, continuous streams of cars driving into and out of the city extend for as much as twenty miles from the center of the metropolis, each stream frequently stopping and starting while cross streams do likewise. Other cities are similarly affected, though perhaps in a less degree.

IT is possible to increase the capacity of many highways without widening them. New roads are not always necessary in order to provide capacity for a greater number of vehicles.

This article points out that physical construction of highways has been studied much more carefully than have such factors as gradients, grade crossings, curves, etc., and points out how car owners might be saved much time and money through closer consideration of such factors.

While the loss of time, fuel and other items cannot be computed with accuracy, it is evident that the community can afford to pay handsomely for any form of construction which will tend to decrease the loss and still realize a considerable net gain on the investment, providing it is wisely made. Greatly increased satisfaction would result from more convenient use of the vehicles and greater safety would be realized in a more satisfactory highway arrangement.

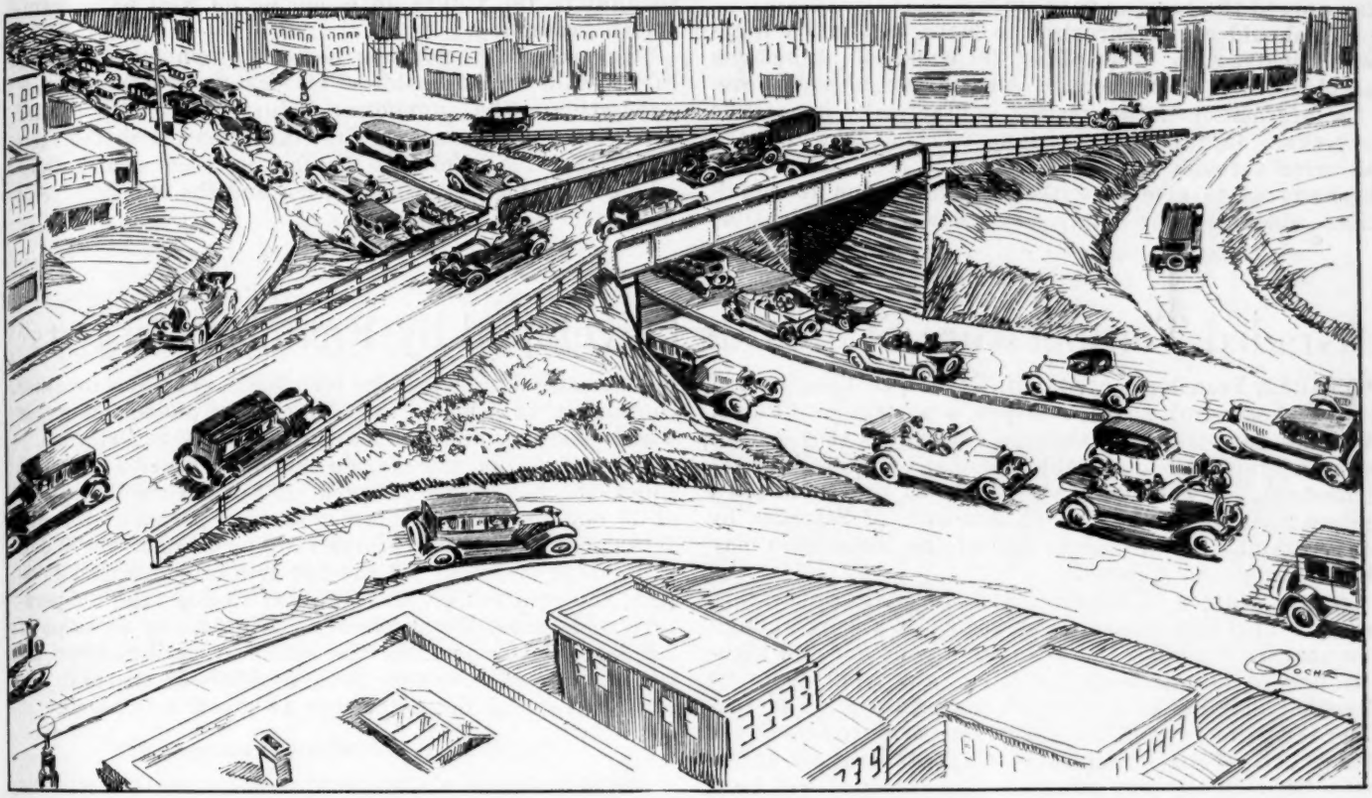
Granting that there is need for study and more general application of facts which govern the economic use of highways, it is worth while to set down in more or less orderly fashion some of the items which require consideration in this connection:

1. **Frequent stops,** due to traffic conditions, result in: greatly decreased traffic capacity, much loss of time to individuals, loss of interest on investment in vehicles, waste of fuel, additional wear on brakes and other parts of the vehicle, more expenditures in traffic control and a greater liability to accidents.

2. **Crossing of intersecting highways at grades** results in: intermittent traffic with the detrimental results cited in (1) above, lower average speed with consequent decrease in traffic capacity, need for large sums spent in police control of traffic, and great increase in number of accidents.

3. **Poor selection of grades** results in: unneces-

One Way to Relieve Congestion at Important Crossroads



The capacity of many main highways could be increased materially if tie-ups at important crossroads could be avoided. Grade crossings at such points would improve the situation materially

sary waste of fuel, excessive wear on brakes, increased liability to accidents, probable decrease in average speed and traffic capacity and loss in time.

4. **Curves** in the highway, especially abrupt ones, are likely to result in increased accidents and loss of time due to lower average speeds.

These are a few of the items which should receive consideration in determining what, in the end, will be the type of highway which will give the lowest cost of automotive transportation to the community with minimum inconvenience to the user. They are deserving of just as much study as are the civil engineering problems involved in the design and construction of the surface of the highway, subgrade, drainage, etc., and may have as much, if not more, effect than such factors in determining the cost per vehicle mile of operation, which, in the last analysis, is what interests the user whether he is aware of the fact or not.

Parallels for some of the foregoing items are to be found in consideration of railroad operation. Street railways are subject to much the same limitations as vehicular traffic in respect to frequency of stops and are, therefore, as everyone knows, much slower and capable of carrying, track for track, much less traffic than an overhead or underground railway which is not subject to the delays of transverse traffic.

Avoiding Frequent Stops

The difference in speed in a case of this kind is not so much one of safe operation as it is of delays due to frequent stops. It is not contended, in respect to automotive traffic, that maximum speeds should be increased —although this might be done safely and with profit in some cases—as it is that the vehicles should be kept in motion, in order that average speed may be reasonably high.

Generally speaking, the first cost of the construction of highways which cross each other is less if the crossings are made at grade, but it does not follow that such construction is cheapest in the end nor, on the other hand, that crossings at grade should be eliminated in most or even in a majority of cases. Each case should be considered on its merits and the possibilities of some alternative form of construction need not be overlooked.

Traffic Control Costs Lowered

The cost of traffic control alone at important intersections is not inconsiderable, and when there is added to this the delays and other losses pointed out above, a considerable investment calculated to avoid such losses is justified easily.

Another factor which is given much consideration in railway work, but relatively little in highway construction, is that of gradients. Railways spend great sums in reducing gradients, knowing that the investment will be justified by lower operating costs. The same must be true of automobile highways, although we know of no precise data on the basis of which the most economical grade can be determined. It doubtless varies with different classes of vehicles, and some sort of mean result for the kind of traffic carried ultimately will be worked out. This is just one of many problems which deserves study and will require research for its solution.

Somewhat the same thing that has been said concerning gradients may be said concerning curves, although a different set of factors enter. Generally speaking, curves should be avoided, if for no other reason than that their existence is a potential source of accidents. When necessary, however, they should be made

as gradual as conditions permit and all reasonable steps should be taken to enable operators of vehicles to see as far around the turn as possible.

We should not be surprised to learn that faulty highway construction is as often the cause of automobile accidents as is faulty vehicle construction, although precise information in this respect is practically impossible to secure. Certain it is that innumerable accidents have occurred through someone's failure to so construct the highway as to give reasonable consideration to conditions which promote safety. Just how far it is feasible to go in matters of this kind it is difficult to determine, but it is certain that the matter should be given more thought in the future on economic as well as humanitarian grounds.

Highway congestion has become a controlling factor in the sale of automobiles, at least in areas of dense population. The automotive industry can help toward removing this obstacle by drawing attention to the facts in the case and helping to disseminate them among those who control highway construction and the expenditure of money for road building.

Graded Temperature Standards Developed by French Scientists

THREE French scientists (H. Gardot, H. Laugier and R. Legendre) have developed a system of graded, constant temperature standards for which they expect a considerable demand in the chemical and metallurgical industries. A note on the system was presented at a recent meeting of the French Academy of Sciences by J. L. Breton. The principle underlying the system may be described as follows:

If two sources of constant and unequal temperature are provided and connected by means of a body of high thermal conductivity, there will be a constant and regular flow of heat through the latter, any point along its length remaining at a constant temperature. The further the point is from the higher temperature source the lower will be its temperature. The temperature difference between any two points on the "bridge" will be a constant fraction of the temperature difference between the two sources.

According to the maximum temperatures that it is desired to utilize, the higher temperature source may be a bath of some fused material, a bath of a boiling liquid, a bath of a liquid whose temperature is controlled, an electric resistance provided with a regulator, or any other source emitting heat at a constant temperature.

Similarly, the cooler source, through which the calories conducted by the "bridge" are disposed of, may be a current of liquid at a constant temperature or a bath of a partially fused or boiling mass.

Metal Bridge Is Insulated

The bar of metal which forms the bridge between the two sources of heat is made of a metal of high heat conductivity, such as copper or aluminum. Its form is determined with a view to minimizing the loss of heat through its lateral faces, or, still better, it is heat-insulated everywhere except at the two ends in contact with the two sources of heat.

For commercial standards, use is made of aluminum, notwithstanding the fact that its heat conductivity is only half that of copper, because its specific heat is more than twice as great and it melts at 1150 deg. Fahr.

Other reasons for the selection of aluminum are its low specific gravity, its price, and the facility with which it can be cast. A bar is formed of this metal which has a quadrangular section throughout the length used for experiments, the ends being turned in an easy curve at right angles and dipped each into one of the two constant temperature sources. The whole has the appearance of a massive bridge. A sheet of asbestos held in position by clips surrounds the straight portion of the bar.

In the upper surface of the bar there are formed a series of ten cavities, in which may be lodged, according to their size and shape, the test tubes, crucibles or other containers in which takes place the phenomenon for which the optimum temperature is to be ascertained.

In one of the models, designed to receive ten test tubes, the hot source being at 100 deg. C. and the cold at 15 deg., one has at his command a series of ten different constant temperatures ranging from 28 to 70 deg. C. in steps of 5 deg. If the hot source is reduced to 60 deg., the cold source remaining at 15 deg., the temperature scale extends only from 21.5 to 44 deg. in steps of 2.5 deg. By diminishing the temperature difference between adjacent cavities it is possible to increase the sensitiveness of the apparatus as much as desired.

Cavities at Constant Temperature

The constancy of the temperature of the separate cavities is said to be such that no thermostat could equal it, for the reason that any slight accidental variations in the temperature of one of the sources (owing to lag of the regulator, for instance) are spread over the whole mass and act only very feebly at any given point.

An apparatus of this kind can be used for determining the fusing and boiling points of numerous materials; it forms an excellent standard of comparison for low temperature fusible alloys; it constitutes a more accurate means of determining the melting points of fatty materials, and there is a possibility even of utilizing it for the determination of the ignition temperatures of petroleum fuels.

Chemical reactions take place at different rates of speed according to the temperature, and the apparatus permits of operating simultaneously at ten different known temperatures, and thus of quickly determining the optimum temperature for any given chemical process. A photograph taken of the ten test tubes at the end of the test constitutes a graph, as it were, of the variation of the phenomenon with the working temperature.

Malleable Iron Methods Improved

ACCORDING to M. Gailly of Charlesville, who presented a paper on the subject at the recent Foundry Congress in Paris, considerable progress has been made in France in recent years in the production of malleable cast iron, but France is largely indebted for this progress to the United States, American methods having been followed to a great extent. It is now planned to introduce trade control over the quality of the castings delivered to customers, similar to that now exercised in this country by the Association of Malleable Iron Founders. It was also brought out at the congress that the dissemination of the results of research relating to cast iron is hampered by the lack of recognized translations of foundry terms, and the preparation of a dictionary of terms was decided upon.

Here and There in Foreign Markets

Courtesy Automotive Division, Bureau of Foreign and Domestic Commerce

New Brunswick Takes Two Thousand Cars

ALTHOUGH the sale of new cars in New Brunswick probably will drop off somewhat during 1924, the market for automobile parts and accessories may not be affected to the same extent, nor will the proportion of American-made goods suffer because the ratio of American-built cars is so large that the demands for parts from the same source will not diminish.

The factors operating against increased car sales include unimproved economic conditions and the large number of used cars for sale. The total registrations in the province at present do not exceed 17,000 passenger cars and 1000 motor trucks, with an average increase of approximately 2000 cars per year.

Ceylon Buys Twelve Hundred Motor Vehicles

MORE than 1200 automobiles and trucks, valued at $1,100,000, entered Colombo, the principal port of Ceylon, during 1923. In 1922 the imports totaled 584 vehicles and in 1920, a record year in almost all parts of the world, 925. Up to November, 1923, 31 American manufacturers, including their Canadian factories, had furnished 1004 cars and trucks, valued at approximately $728,000; Great Britain, 109, valued at $150,630; France, 74, worth $65,460, and Italy, 11, at $15,536.

American motor vehicles have affected the steam railway traffic in the entire island of Ceylon to a considerable degree.

It is reported that at one station the daily receipts have been cut in one year from 700 rupees to 300 rupees, and in order to counteract this development the Government is seriously considering the advisability of expediting the Aberdeen-Lakapana hydro-electric scheme and constructing electric railways. Transportation competition to the densely populated districts of Colombo has also increased.

Buenos Aires to Buy Motor Equipment

THE city of Buenos Aires, Argentina, is receiving bids for automotive vehicles to perform, approximately within four hours, the work of cleaning and watering pavements of wood, asphalt, granite, and coarse stone, and transporting 2500 metric tons of garbage to the incineration plant.

Bids will be opened July 25, 1924. A guaranty of 50,000 paper pesos must accompany a general bid for all the supplies required, or 25,000 for a partial bid. One vehicle of each type offered must be provided for practical tests.

American Cars Lead in Finland

THE sudden development of the automobile trade in Finland is clearly set forth by official figures transmitted by Trade Commissioner C. J. Mayer, giving imports of motor cars for 1923 as 1309, against 360 in 1922. Motorcycles imported in 1923 amount to 1708, against 354 in 1922.

Competition in Finland in the automobile business is becoming very keen. Generally speaking, the high discount rate obtaining in the country at the present time and the scarcity of money will have a tendency to hamper imports in 1924. On the other hand, the customs duty for automobiles has been reduced. This should encourage imports. The imports of cars in Finland is negligible and the general trade is characterized by a demand for cheap cars. Traffic has been taken up considerably by motor omnibuses and this branch will probably develop more and more.

In all likelihood American cars and trucks probably will continue to lead competitors in Finland, Trade Commissioner Mayer says, although French competition is expected to be strong in view of the lower value of the franc, and Italian "Fiat" cars are expected to make a good showing. German cars are still too expensive for the market, and English cars quite out of the competition because of their high prices.

Rumanian Market in First Stage of Development

ALTHOUGH Rumania possesses great potentialities for industrial development and therefore for the development of automotive uses, Acting Commercial Attaché Louis E. Van Norman, Bucharest, reports it is making somewhat slow progress in the face of large reconstruction problems. The country covers an area almost as large as Italy and comprises the rich agricultural and industrial regions of Transylvania, Bessarabia and Bucovina, as well as the old kingdom, but the automotive industry is still only in the first stages of development.

Outside of Bucharest there seem to be no agents nor distributors of automobiles. It appears that the chief obstacles to sales at present is the difficulty of finding of proper agents and of arranging conditions of payment.

Durant Service is Aided by Prompt Shipment of Parts

Over 95 per cent of orders are filled on day of receipt, hence dealers need carry less stock. Requisitions on factory placed four months in advance tend to prevent shortages. Model garage with recommended tool equipment proves to be good object lesson.

EFFICIENT methods and adequate stocks have made it possible for the service parts depot of the Durant organization at Elizabeth, N. J., to fill and ship the day they come in more than 95 per cent of the orders received. Between eight and nine thousand different parts are stocked to take care of all models of the Durant Four, Durant Six and Star. Often only one or two of these parts are missing from the current inventory.

This prompt parts service has been an important factor in establishing and holding the good-will of dealers and of dealers' customers. Another feature of this Durant service depot, designed to achieve the same end, includes a sort of model garage, equipped with a set of tools specially designed to facilitate repair work. In addition, dealers are aided in their service work with the customary advice on repair and maintenance through correspondence and through traveling service men.

To insure an adequate supply of parts at all times, parts are ordered four months in advance from the various factories involved. The well worked out system used in ordering is largely responsible for avoiding delays in shipment which are so annoying both to the service station and the car user. By having a complete stock at the factory and assurance of prompt shipment to dealers, the latters' inventories may consist chiefly of parts which are in considerable demand and have a rapid turnover. Dealers do not have to tie up their capital in parts seldom required. This more rapid turnover naturally aids dealers to make a greater profit on parts because of the smaller capital investment required.

The model garage is maintained as a school of instruction for all head mechanics and service managers of various distributors and dealers who are sufficiently interested to visit it and learn what are believed to be the most efficient methods of handling repair work.

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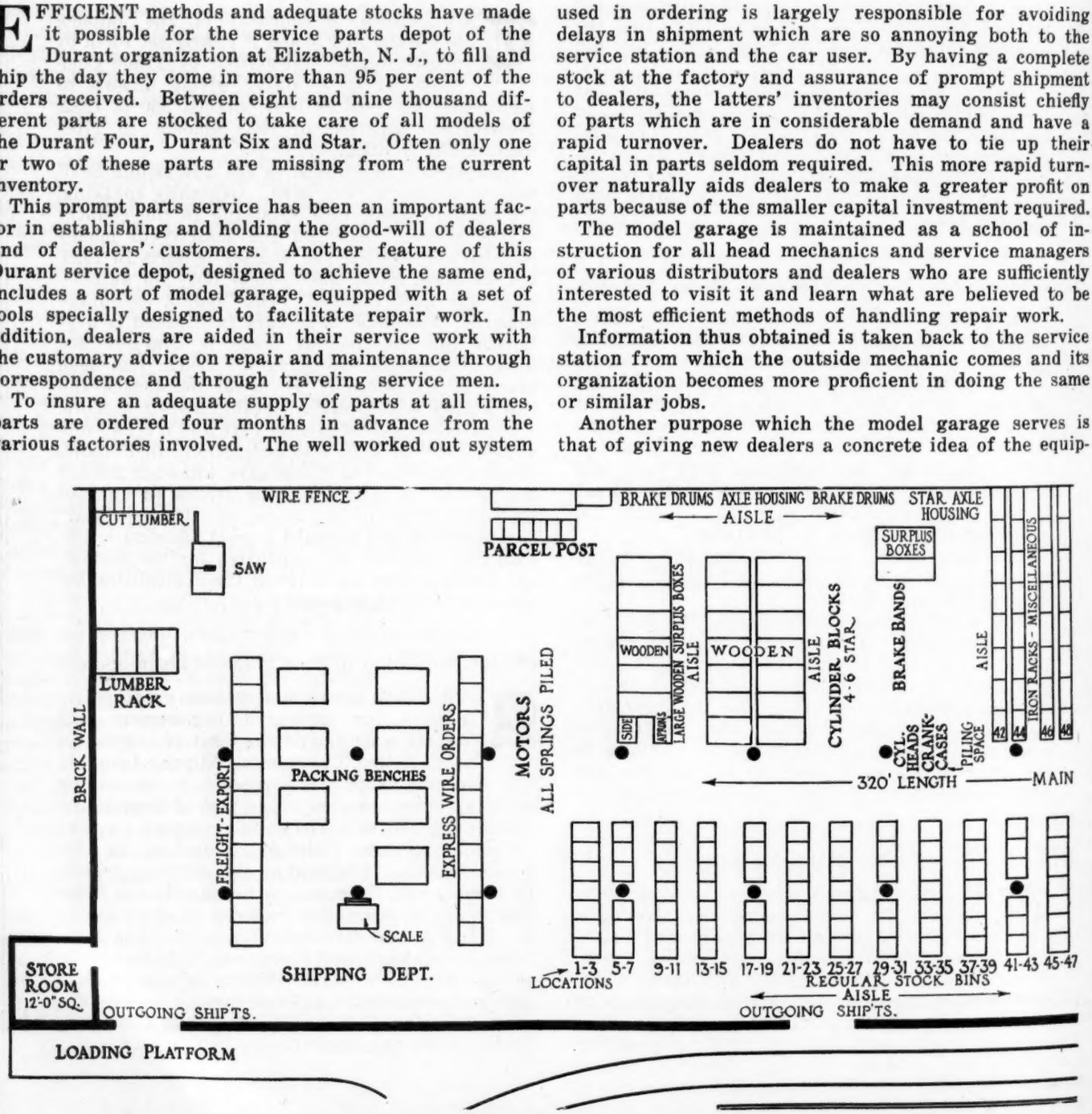


Floor plan of the service parts department in the Durant plant at Elizabeth. Parts are received near one end and

ment which they should install in order to handle service efficiently and profitably.

Equipment Complete But Unpretentious

There is nothing pretentious about the model garage. It contains space for ten or twenty cars, a small stockroom equipped with Durant steel bins especially designed for the stock of repair parts which is recommended for an establishment of this size, and the various tools designed to facilitate repair work. In one corner of the garage are benches containing the recommended tool equipment, engine stands, etc.; in another a heating plant, and in a third a small office and waiting room.

It is such a garage as might be required by the average Durant and Star dealer. The tool equipment includes such special tools as are required to make efficiently repairs on the various Durant and Star models.

The accompanying diagram of the layout of the general parts depot department indicates how much thought has been given to handling of the parts stock. It will be noted that the stockroom is adjacent to a rail siding long enough for three cars, and that incoming material is landed near one end, while outgoing shipments leave near the other end of the long room. Thus there is a general flow of parts from the receiving department to the stock bins and from the bins to the shipping department with a minimum of handling and counterflow.

Upon receipt, all parts are checked against the shippers' list and a record thereof is sent to a department in which a perpetual inventory is kept. Parts which are subject to rust and on which the turnover is not rapid, and particularly parts which are intended ultimately for export, are dipped in an Oakite cleaning solution and then in a heated bath of Coral oil which gives them a paraffin-like coating which prevents rust.

Parts then are stored in Durant steel bins designed especially for the purpose. Parts of similar character are kept together and each bin is numbered in such a way as to facilitate finding the part in minimum time.

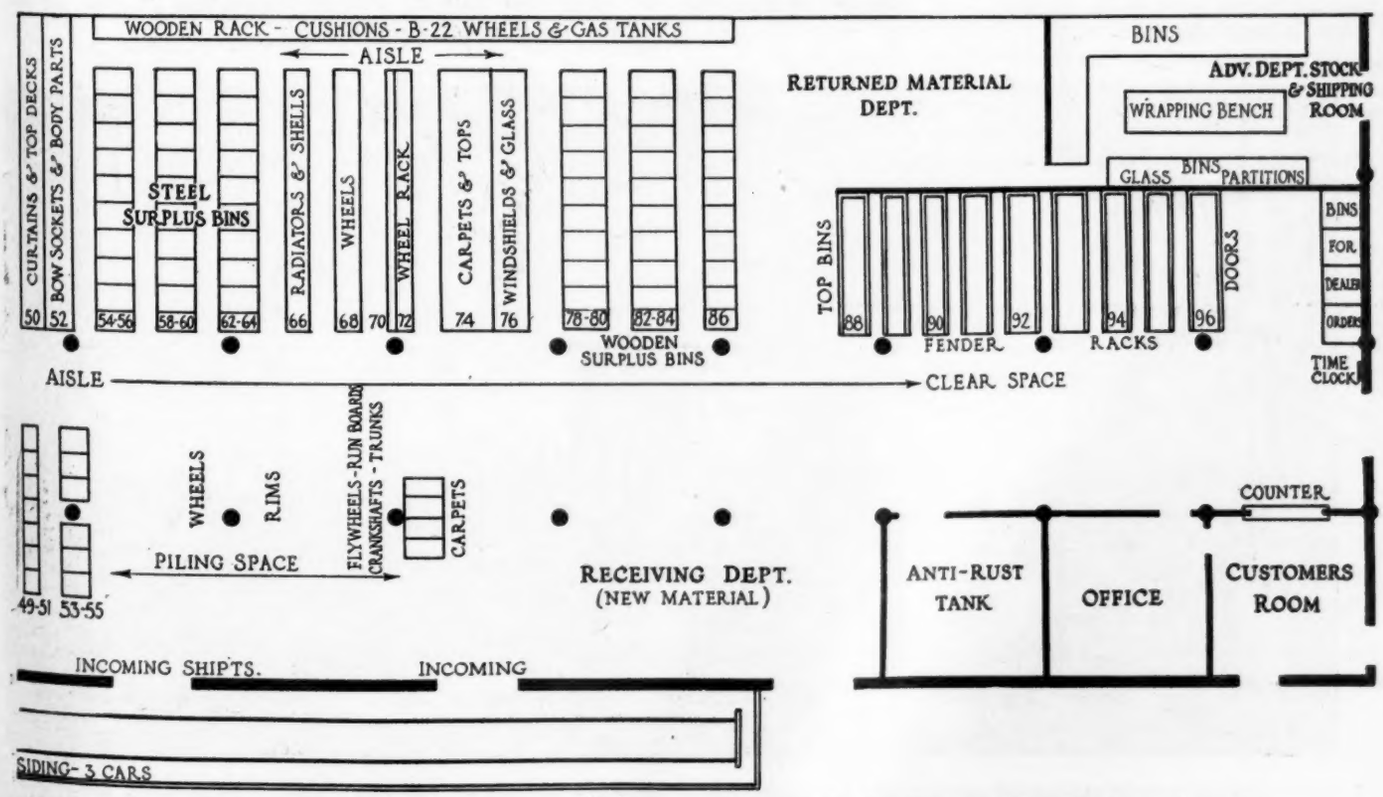
Stock packers are provided with wheeled containers upon which they place material ordered as it is taken from the bins. These orders are checked by an inspector and again by a second inspector before they are passed to the packing department. This department is supplied with all necessary packing materials, including corrugated paper cartons for fenders and similar parts, and lumber which is cut to a variety of standard lengths sufficient to meet all needs, using a power saw provided especially for this purpose. Packers receive the order after it has the O. K. of the inspector, select lumber of the desired size from bins provided for this purpose, make up from it a box of the required size, carefully pack the parts, inclosing with them a copy of the invoice provided for this purpose, and mark the box with the name and address of the consignee.

Shipments are made by freight in a majority of cases and the shipper pays freight on orders amounting in value to $300 or over. Freight shipments are loaded directly into cars on the siding, whence they are taken to a nearby distributing station by the railroad. The shipping department is divided into four sections, each with a different set of receiving shelves intended respectively for freight, express, parcel post and export orders.

Record System Is Simple

To avoid delay on express orders, these are not entered in an express book, as is usual, but the bills of lading, usually made out at the express office with an accompanying delay of a day, are made out by Durant employes and have only to be checked by the express company. Foreign shipments are, of course, packed in the special manner required.

Whenever possible the entire order is filled in one shipment, which, as a rule, goes out the same day the order is received. In case some of the parts ordered are not in stock, but have been shipped from the factory and are expected in a day or two, shipment may be delayed for that length of time, but otherwise items in



shipped near the other end, with storage bins between, thus minimizing the handling and counterflow of parts

Durant Service is Aided by Prompt Shipment of Parts

Over 95 per cent of orders are filled on day of receipt, hence dealers need carry less stock. Requisitions on factory placed four months in advance tend to prevent shortages. Model garage with recommended tool equipment proves to be good object lesson.

EFFICIENT methods and adequate stocks have made it possible for the service parts depot of the Durant organization at Elizabeth, N. J., to fill and ship the day they come in more than 95 per cent of the orders received. Between eight and nine thousand different parts are stocked to take care of all models of the Durant Four, Durant Six and Star. Often only one or two of these parts are missing from the current inventory.

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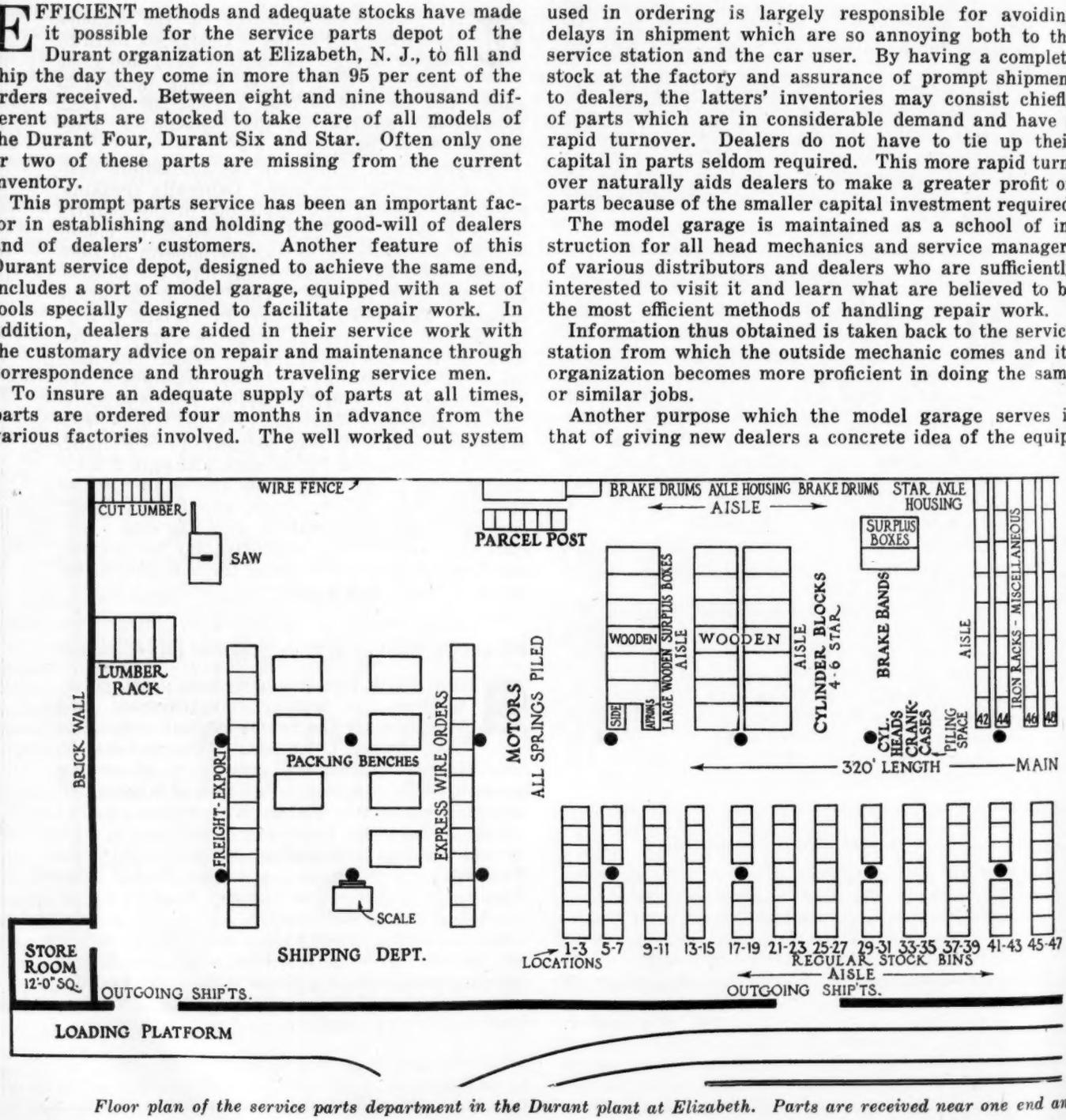

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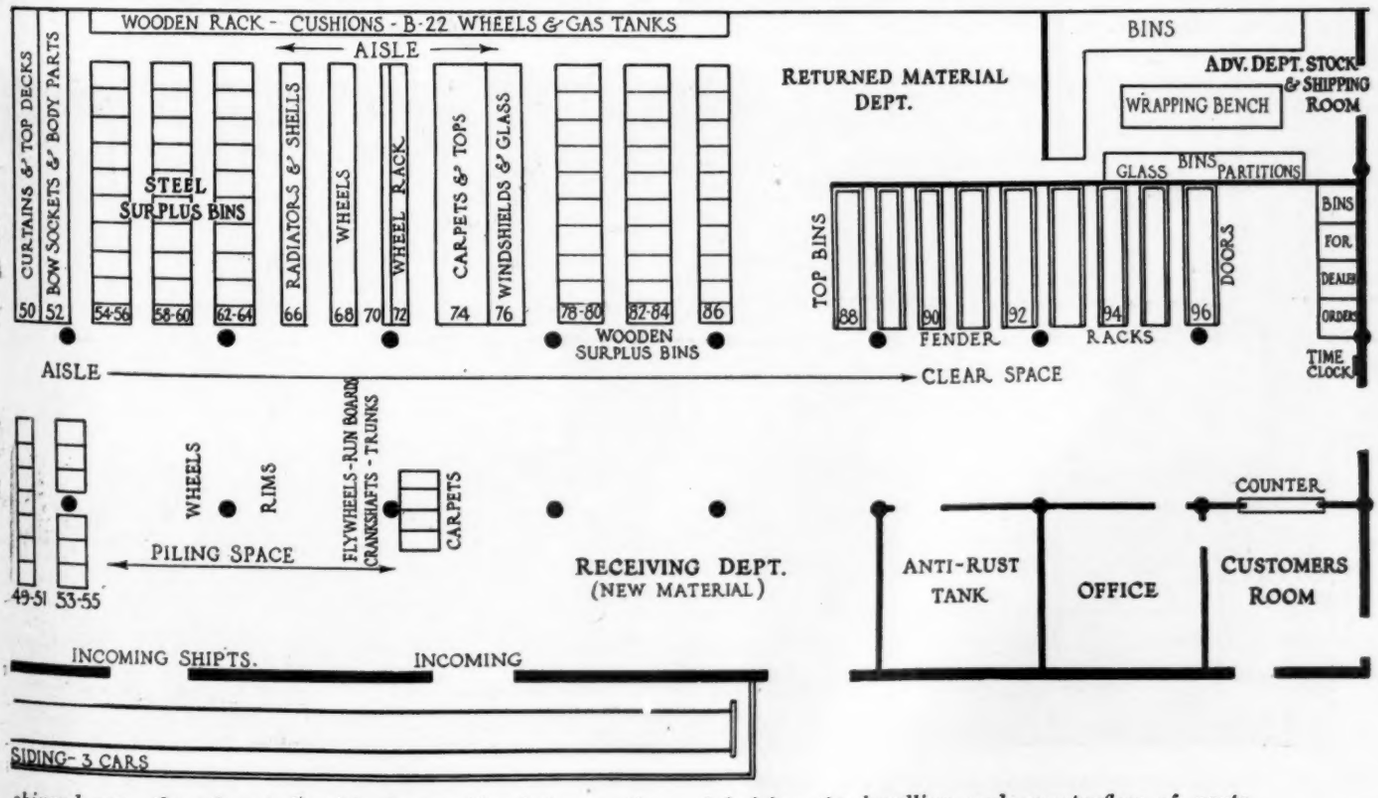

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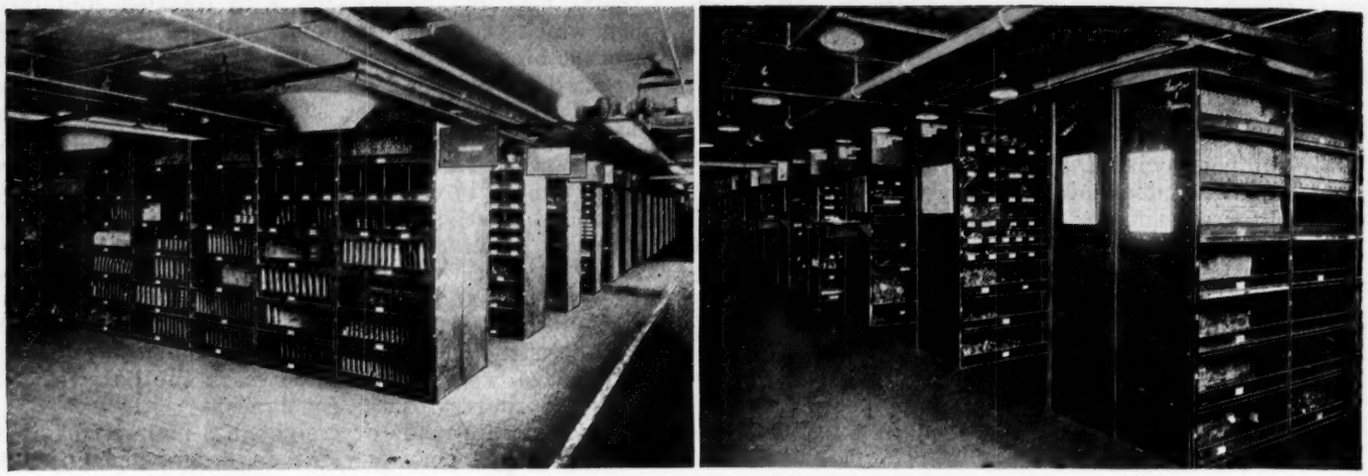


View of service parts department in the Elizabeth plant of Durant Motors, showing orderly manner in which parts are stored

stock are shipped and other parts are back ordered for shipment upon receipt.

Seven Copies of Order Made

Upon receipt of an order from a dealer, seven copies thereof are made immediately by the parts department. Each of these contains the same serial number, which becomes the order number to which reference is made in case of claims for shortage, etc.

Copy No. 1, known as the mailing copy, is sent to the accounting department, where the price of the parts, extensions and footings are put on, after which the copy is mailed to the customer if he has an account, or is sent out with the goods if same are shipped C. O. D.

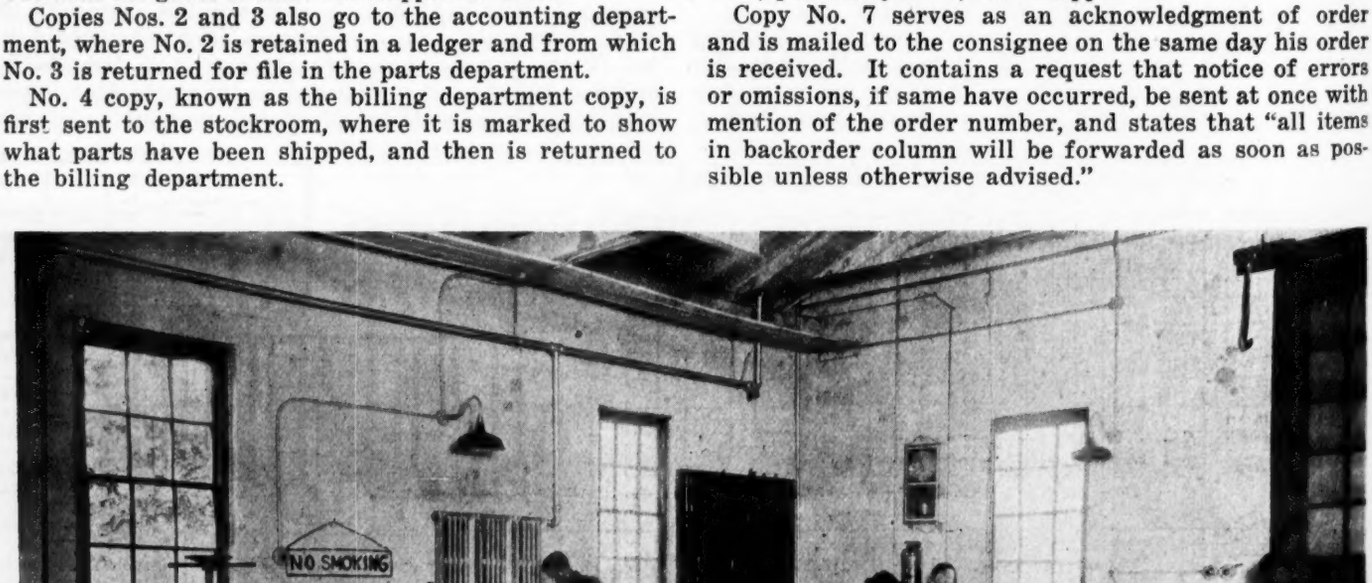
Copies Nos. 2 and 3 also go to the accounting department, where No. 2 is retained in a ledger and from which No. 3 is returned for file in the parts department.

No. 4 copy, known as the billing department copy, is first sent to the stockroom, where it is marked to show what parts have been shipped, and then is returned to the billing department.

Copy No. 5, called the parts department shipping copy, is a file copy for the parts department office. It contains space for recording date of shipment, name of shipping clerk, number of bales, packages, crates and boxes shipped, how shipped, etc.

No. 6 copy serves as a packing slip and is sent out with the goods. It contains the following marking: "No claims allowed unless notice in writing is made within 5 days from receipt of goods and must be accompanied with this packing slip. All items not shipped are back ordered and will be forwarded as soon as possible unless otherwise advised. Mention above order No. in correspondence. Checked by ——, rechecked by ——, packed by ——, date shipped ——."

Copy No. 7 serves as an acknowledgment of order and is mailed to the consignee on the same day his order is received. It contains a request that notice of errors or omissions, if same have occurred, be sent at once with mention of the order number, and states that "all items in backorder column will be forwarded as soon as possible unless otherwise advised."



A corner of the model garage which Durant maintains adjacent to the Elizabeth plant. Practically all of the tools recommended for service work in a shop of this size are shown in this view

Form 710 NAME..... QUANTITY ON STOCK ORDER PART No. .....

PURCHASED FROM..... MFG. No. .....

ORDER				RECEIPTS				BALANCE ON HAND END OF MONTH	DISBURSEMENTS												
DATE	ORDER No.	QUANT.	DUE	ACCT TOTAL	DATE	R. S. No.	QUANT.	ACCT TOTAL	DATE	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
									1												
									2												
									3												
									29												
									30												
									31												
									MULTIPLE												
									FORECAST												
									TO ORDER												

Specimen of the perpetual inventory sheet, which shows also the quantity of parts on order, and has space for advance estimates of requirements

Each of the seven copies contains columns headed as follows: No. ordered, No. shipped, No. back ordered, part No., and model. There is also space for the date and number of the customer's order, date entered, date shipped and method of shipment. While the foregoing, in the form of a description, may seem somewhat complicated, in reality it is quite simple and is understood to be serving its purpose to good advantage.

It remains now to describe the method employed for keeping on hand a supply of parts sufficient to meet all needs without tying up an unnecessarily large amount of capital in inventory.

Future Business Estimated

To accomplish this result it is necessary to make an estimate of the number of parts required at some time in the future equal to the length of time it will take the factory, under normal conditions, to supply these parts. In the case under consideration this is four months. Such an estimate, made, let us say on Jan. 1, is based on the following factors: Sales in preceding month (December), number of cars assumed to be in use on Jan. 1 in the particular territory served, number of cars to be produced for this territory during the four-month period, and logical expectations of parts sales, based on past history.

Suppose the number of cars assumed to be in use on Jan. 1 is 100,000, that the schedule of manufacturing calls for 2000 cars in January, 2500 in February, 3500 in March and 5000 in April, and that the total sale of parts in December amounted to $150,000, or $1.50 per car in use.

Assume that past history shows that parts sales in January are 10 per cent greater than in December and that the corresponding figures for February, March and April respectively, as compared to December, are 12, 18 and 26 per cent.

Assume, further, that the sale of parts for new cars manufactured will be the same as for cars already in service on Jan. 1. Then the parts sales in four months will be as follows:

Jan. $150,000 + (10% of $150,000) + (2,000 × $1.50) = $168,000
Feb. $150,000 + (12% of $150,000) + (2,500 × $1.50) = $171,750
Mar. $150,000 + (18% of $150,000) + (3,500 × $1.50) = $182,250
Apr. $150,000 + (26% of $150,000) + (5,000 × $1.50) = $196,500

It is assumed that the number of parts sold increases at the same rate as the total income from sales. Consequently the number of parts sold in January will be 168,000/150,000, or 1.12 times that in December. Similarly, the sale of parts in February, March and April will be, respectively, 1.14, 1.21 and 1.31 times that in December.

A Specific Example

Applying this to a specific part, say to the case of a valve, suppose that 100 valves were sold in December. Then 112 will be needed in January, 114 in February, 121 in March and 131 in April, or a total of 478 valves in four months. Now, if it happens that there are in stock on Jan. 1 89 valves, and that a total of 240 already have been ordered for delivery in January, February and March, 149 is the number to be ordered for April delivery.

This is the routine method on the basis of which the Durant organization orders its spare parts from the manufacturing source. While in some cases the method gives results which must be modified for one reason or another, it has been found quite satisfactory. Naturally the manager of the parts department and his assistants must use discretion in meeting particular cases, and there must be provision for filling hurry orders when some unforeseen circumstance creates an abnormal demand for some particular part.

A section of the sheet on which is kept a perpetual inventory, as well as a record of the orders for parts and the estimate of needs used in reordering, is reproduced in the accompanying cut. A sheet of this kind is kept for each part in the parts list and said list is revised and brought up to date twice a year.

Cobalt Magnet Steel

AT a recent "conversazione" of the Royal Society in London, F. Harrison Glew showed an experiment which indicates the superiority of cobalt magnet steel over the ordinary kind.

A bar magnet of 15 per cent cobalt steel was set above a powerful fixed magnet and confined between glass plates in such a manner that it was free to move vertically. The magnets were set with like poles opposite each other and the magnetic repulsion lifted the cobalt bar magnet and kept it floating ½ in. or more above the fixed magnet.

It is claimed that the experiment could not be performed with a bar magnet of ordinary magnet steel, for the bar under the intense magnetic field required for flotation would reverse its polarity and be attracted to the fixed magnet.

Separate Operation of Front and Rear Brakes Favored by British Expert

Says such an arrangement is not only cheapest but best from practically every standpoint. Lack of rigidity called chief cause of chattering. Tubular front axle recommended. Exact center point steering undesirable since wear is excessive.

By F. A. Stepney Acres*

IN quite early days railway engineers discovered that, for safety combined with high speeds, brakes must be fitted to all weight carrying wheels, and it is surprising that there are still so many automobile engineers who are unconvinced. Of the difficulties and dangers, some are very real and some purely imaginary, but if they are not boldly faced by designers and manufacturers, front-wheel brakes may once more be classed among the failures.

The principal dangers alleged against front-wheel brakes are: risk of front-wheel skid, risk of front-spring failure, and disturbance of steering gear due to brake effort. There are also certain mechanical difficulties owing to the lack of rigidity of the front axle, the nature of its movements when the brakes are applied and the fact that front springs almost invariably are anchored at the forward end. But the greatest danger of all is the thoughtless and incompetent driver, whose cure or elimination are outside the scope of this paper.

A front-wheel skid is admittedly very disconcerting and, since it cannot be corrected, it gives the driver a feeling of utter helplessness. There is very much less risk of front-wheel skid with a four-wheel braking system than of rear-wheel skid with rear brakes only under any given set of conditions, and a front-wheel skid at least has the merit that the car goes straight on instead of swinging round as in a rear-wheel skid.

Braking Should Not Affect Steering

Disturbance of the steering gear due to braking effort is absolutely non-existent in any sound design, the sole requirement in this particular connection being that the center line of the steering pivot pin should meet the ground within the surface of contact between the tire and the ground. The point should be sufficiently out of center to give a slight drag, as, if it is truly central, it is found that the wheel tends to follow every inequality of road surface, and even slight play in the steering connections rapidly becomes excessive through hammering. If this drag is slight, say, ½ in. or ⅝ in., the load imposed on the steering connections due to brake effort is negligible and, since the two sides approximately counterbalance one another even with appreciable inequality of braking effort, none of this load finds its way to the steering gear housing. That even the heaviest of braking effort does not tend to pull off the road a car having a properly designed four-wheel brake system has been demonstrated amply.

Another essential feature in front-wheel brakes is that steering movements of the wheels must not apply or release the brakes. It is common knowledge today that this result is obtained by making the effective connection between operating rods and brake shoes act also on the center line of the steering pivot. This principle of operation, combined with what is now called centrally pivoted steering, was laid down as long ago as 1904* by the late P. L. Renouf. All front-wheel brakes today, however different their mechanical construction, incorporate these two features.

Possible Brake Arrangements

Having decided to fit brakes to all wheels, there still remains the question of grouping and operation. The alternatives which are open divide themselves naturally into three main groups, which may be defined as independent, semi-independent, and coupled, and which may be tabulated as follows:

	Hand Operated	Foot Operated
Group I		
Independent	(a) Front	Rear
	(b) Rear	Front
Group II		
Semi-independent	(a) Front and Rear	Rear
	(b) Front and Rear	Front
	(c) Front	Front and Rear
	(d) Rear	Front and Rear
Group III		
Coupled	(a) Front and Rear	Additional Rear
	(b) Front and Rear	Transmission
	(c) Additional Rear	Front and Rear
	(d) Transmission	Front and Rear
	(e) Rear	Front and Transmission

Of these arrangements, Group I is certainly the cheapest, and is a perfectly sound arrangement. Group II is the type in which one brake acts independently, but operation of the second picks up the first also by means of a slotted link or the like. This is very little more expensive than Group I.

Group III is the true four-wheel brake system; it includes the six-brake system and is considerably more expensive, since it calls for an additional brake on the rear wheels or the transmission. Apparently no one has considered fitting the extra brake to the front wheels, although from the point of view of stopping power alone it is the right place. This group also calls for some form of servo gear, at any rate on a heavy vehicle, and thus puts the cost up still further.

The first question in considering Groups I and II is, should the front brake be included in the service (foot-brake) system? The author is very strongly of opinion that it should not, on the grounds that:

(i) The rear wheel brake is capable of doing all the work normally required of a service brake.

(ii) Very few drivers are accustomed to anything other than a rear wheel brake.

*Condensed from a paper presented before the British Institution of Automobile Engineers.

*Patent No. 19044 of 1904.

(iii) Injudicious use of brakes is generally more disastrous in the case of front wheel brakes than of rear wheel brakes.

(iv) A rear wheel skid can be corrected, while a front wheel skid cannot.

(v) The foot brake is much more liable to injudicious or violent application than t' hand brake, which is usually "felt."

(vi) Any front axle or front suspension failure is much more serious than a rear-axle or suspension failure of the same kind and, therefore, while the front axle, etc., must be well up to its load, it should not be compelled to take that load more often than necessary.

It may be urged that if these objections hold good, why adopt front-wheel brakes at all? The answer is, because they most certainly give greatly increased stopping power in an emergency, much greater than is required in the ordinary way, and even the most careful driver meets that emergency sometimes.

Various Brake Hook Ups Compared

This argument as to the service brake, of course, only applies to Groups I and II, and the conclusion the author would draw is that arrangements I (a) and II (a) are far the most desirable in these two groups. Of these, in turn, I (a) would appear distinctly preferable on the ground that it allows the brakes to be used alternately on a long descent, while II (a) does not, and that I (a) gives greater stopping power than II (a). Incidentally, this Group I complies with the letter of the law.

The reason for adopting Group III in any form is the desire for a four-wheel service brake, and therefore III (a) and III (b) can be ruled out. A hand operated transmission brake as in III (d) has certain objections, not the least of which is the fact that it will not hold the vehicle steady when fitting a spare wheel on the rear axle. This leaves only III (c) and III (e) which we need consider, and of these, although III (e) has much to recommend it, III (c) is undoubtedly the more popular. The leverage problem is very much simplified, a servo gear is not so necessary, and it is certainly lighter and cheaper than the rear brake. In some cases the transmission brake shoes are made to function as a servo gear for the front brake.

Although price undoubtedly will be the determining factor in making a choice between the various systems, yet the author is firmly convinced that this is one of those rare cases in which the cheapest is also the best. The only sound argument he can find in favor of the four-wheel service brake is distribution of tire wear.

Ratio of Braking Power

The ratio of the braking power exerted at the front wheels to that exerted at the rear wheels in a coupled system has a fixed value in any given vehicle, dependent solely on the relative size of the brake drums, leverage ratios, etc., and it has a very large bearing on the behavior of such a system under varying conditions.

When the brakes are applied or when the vehicle is on a gradient, there is a more or less considerable redistribution of the weight carried by each axle, and the adhesion of the front and rear wheels is modified accordingly.

A down gradient has an exactly similar effect.

The actual amount of this weight transference depends on the position of the center of gravity—its height above the ground in the case of brake application, and its height above the wheel center in the case of gradient, while in any case the harder the brakes are applied the less the weight on the rear wheels and the greater that on the front wheels. This in itself is a sufficiently cogent argument in favor of brakes being fitted to the front wheels, even if only as emergency brakes, quite apart from the logical desirability of fitting brakes to all weight-carrying wheels.

A down gradient favors the front brake, while on an up gradient that is sufficient to seriously reduce the adhesion of the front wheels, brake application sufficiently fierce to cause skidding of either wheels is most improbable.

Rear Wheels Must Lock First

It may be laid down as an axiom that in any four-wheel braking system, application of the brakes, under the worst conditions of brake application, or of road surface, or both, shall never lock the front wheels before the rear ones. Accepting this, the ratio of the brake power at the front wheels to that at the rear becomes a matter of prime importance.

Tests of stopping distances with four-wheel brakes have shown that the coefficient of friction between tire and road, μ, may appreciably exceed unity. At the other end of the scale there are, unfortunately, no figures available, but it is quite probable that the coefficient may be as low as 0.1, say, on town roads in the winter. The curves in Fig. 1 show the relation between μ and K, the ratio of the brake powers at the front and rear wheels in a four-wheel system for all wheels to lock simultaneously for various ratios of static weight distribution, and for a given value of r (the ratio of height of center of gravity above the ground to the wheelbase), namely, 1/5. In the majority of phaetons r will not vary greatly from this. These curves show that for simultaneous locking of the wheels K increases or decreases with μ, and therefore the author considers that the ratio K should be so selected as to cause simultaneous locking only when the coefficient of friction is infinitely small, i.e., that the ratio K must equal that of the static weight distribution. If K is less than this, stopping power is

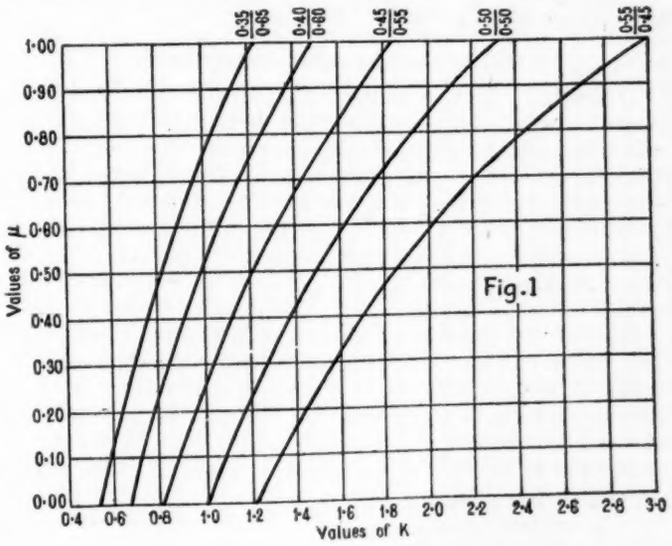
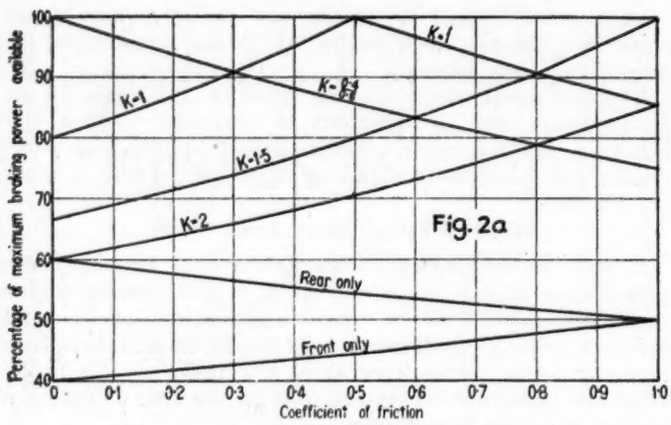


Fig. 1—Curves showing relation between K and μ for various ratios of weight distribution

sacrificed under all conditions, while if K is appreciably greater, conditions may arise to cause front-wheel skid, and therefore a system so proportioned would be liable to give a new lease of life to the prejudice against front-wheel brakes.

By contrast, when a car is designed for purely racing purposes, i.e., for the hands of a highly skilled driver only, the value of K may be based on a much higher coefficient of friction—anything from 0.7 to 1.0. It must be noted that the maximum stopping power is obtained only when both front and rear wheels are just on the



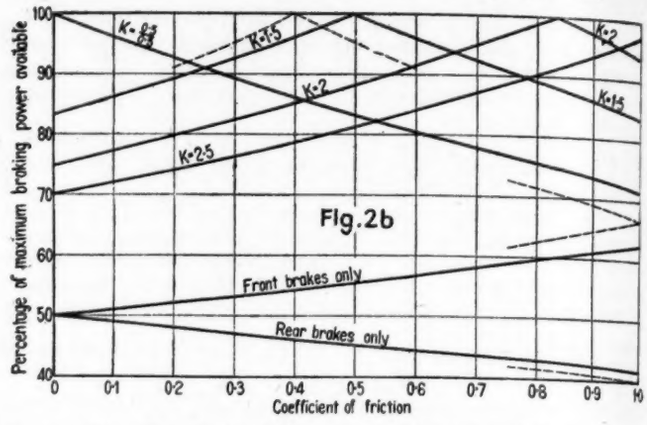


Fig. 2a—Static loading: 0·4 of total weight on front wheels. Fig. 2b—Static loading: 0·5 of total weight on front wheels. In order not to exaggerate the effect of coupling the brakes, a comparatively low ratio of height of center of gravity above ground to wheel-base—1:5—has been taken. How much more marked is the effect of a comparatively high center of gravity is shown by the short dotted portions of curves corresponding to a ratio 1:4. With independent brakes the braking power available is 100 per cent.

point of skidding. Any value of K only gives the most effective possible braking for one definite value of μ; hence to obtain the maximum possible effort for every value of μ, the brakes must be independently applied.

This point of brake-power ratio is of absolutely primary importance if four-wheel systems are to be popular and safe in the hands of inexperienced drivers. Further, one of the principal advantages of four-wheel brakes is the enormous gain in stopping power on a greasy road, and in steadying power on a greasy descent. Let us have independent brakes by preference, but if they must be coupled, couple them so as to make a front-wheel skid impossible.

The curves in Fig. 2 show the percentage of brake power available in a coupled system having different values for K, as compared with that available with independent brakes.

Difficulties Are Not Insuperable

Difficulties in the way of the production of a thoroughly satisfactory front-wheel brake are purely mechanical, and by no means insuperable. It is safe to say that, given reasonable dimensions of the brake details themselves with regard to the work to be done, the whole trouble arises from lack of rigidity in the mountings and in the operating gear, and from the movements of the road springs; while in the case of a coupled system, pedal leverage presents an additional problem.

One of the most objectionable complaints from which any brake can suffer is a tendency to chatter or shudder when it is applied. In the majority of cases this can be traced to lack of rigidity, which may be (a) between the brake drum and the road wheel, (b) between the brake shoes and the final anchorage, that is, the frame, or (c) in the operating gear.

In a transmission brake (a) will probably be the most serious, though it is surprising how often (c) may enter into this, particularly when operation takes place through a bell crank anchored to a frame cross member. In a wheel brake (a), of course, completely disappears, but (b) and (c) remain. In the rear axle (b) is comparatively small, owing to the invariable tubular construction and the short distance between the brake anchorage and the spring, but in the majority of front axles, up to the present, the H section is retained, which is weak in torsion unless very heavy, and the distance from the brake anchorage to the spring is fairly considerable, and therefore (b) is liable to be serious. It is confidently to be anticipated that the common adoption of front-wheel brakes will bring the tubular axle back into favor, as being light, rigid and inexpensive.

Even if any spring which takes place tends neither to apply the brakes harder nor to release them, yet there may still be chatter. The explanation would appear to lie in the difference between the coefficients of friction of rest and of motion, which, for the ordinary brake fabrics, are somewhere in the ratio of 3 to 2, perhaps acting in combination with the natural period of vibration of the parts concerned.

Chatter or shudder can also be set up when any of the deflections of axle or springs due to brake application tend to affect the force of application, and this is doubly likely when any form of servo gear is used. Chattering can arise from three sources, (i) axle torsion, (ii) spring deflection owing to brake torque, (iii) spring deflection due to transferred weight and road surface. It should be noted in passing that the fact of the spring acting as a torque member adds a new factor in the location of the ball for the drag link.

The effect of axle torsion is dependent on the type of front brake gear adopted, but even in the best types it must have some effect, and so we have here an additional argument for the tubular axle.

In a coupled braking system the question of pedal leverage becomes a serious difficulty. The mere fact that four brakes are fitted does not increase the pressure that the driver can exert, and it is useless to have four brakes unless the best use can be made of them in an emergency. In all but the lightest vehicles, therefore, it generally becomes necessary to fit some form of servo gear to operate four-wheel brakes. Such a gear, however, adds considerably to the cost, to the weight, and to the complication, and therefore to the risk of failure, while the design of many of them is such as to render them inoperative in the reverse direction, and their effectiveness falls off at the lower speeds; yet it is generally at quite low speeds, such as in towns, that the heaviest brake application is necessary or safe.

Concerning Servo Mechanisms

The author does not assert that all servo gears suffer from this fault, but it is true of quite a number. Such a gear, that will operate effectively without hesitation, at any speed, and in either direction, is undoubtedly a very desirable accessory when the price of the car justifies it, but even then it must still be possible, although perhaps with an effort, to apply the brakes fully should the servo gear brake down completely. The author's opinion is that heavy application of the brakes should call for quite an appreciable effort, so that a nervous or excitable driver should not be able to lock the wheels too easily.

Greatest care also must be taken as to the rigidity of brake connections, particularly the torsional deflection of any cross shafts, etc., since the available pedal travel is strictly limited. The author does not like transmission brakes, but they are very helpful in this application, for the coupling of front-wheel and transmission brake goes a long way toward solving the difficulties both as to leverage and rigidity; since the pressure required for application is comparatively light, they may be adjusted comparatively closely, very much closer than may a wheel brake, and therefore will not require such frequent adjustment, and the operating connections may be very short and rigid. In fact, the author is somewhat unwillingly forced to the conclusion that this particular arrangement is the best solution, if coupled brakes are to be used, on all grounds—simplicity, efficiency, reliability, weight and cost.

Approximate Center Point Steering Desirable

It is commonly accepted that some form of centrally-pivoted steering must be used in conjunction with front-wheel brakes in order to relieve the steering connections of stresses due to brake application. There are two methods of obtaining this result in common use; in one the ordinary form of stub axle is used, and the rake of pin and stub is made such that the line of the swivel pin meets the ground at or near the track line; while in the other a live wheel spindle is used in conjunction with a fairly heavily dished wheel and a vertical, or practically vertical, pivot. A third method of using the ordinary stub axle and vertical pivot with a heavily dished wheel is not usually satisfactory owing to the position of the load line with regard to the bearings.

It is the author's experience that an absolutely true central steering is not at all desirable, but that the pivot line should be slightly inside the track line, enough to insure that the load on the steering tie-rod is always in the same direction, but not enough to put a heavy load on when the brakes are applied. If this is not done, a chatter is quickly set up and wear on the tie-rod fork pins is excessive.

Vertical Knuckle Pivot Preferred

With regard to the relative merits of the two methods the author does not care to express any very definite opinion, although he always has a feeling that the vertical pivot, dished wheel type is the better from the point of view of ease of steering, since with the outwardly raked pivot the whole weight of the car has to be lifted slightly in order to effect steering movements in either direction. On the other hand, the live spindle type forms an ideal Wöhler fatigue test, the stress in the spindle ranging from a positive maximum to a negative maximum with each rotation of the wheel.

By the term vertical pivot it is only implied that the pivot has no outward rake; no form of central steering does away with the necessity for a slight forward rake.

It must be borne in mind that brake compensation, as ordinarily understood, does not at all mean equalization of the brake effort at the road wheels, but only equalization of the pull in the brake operating rods. The levers on the axles may be pitched at different angles owing either to faulty fitting in the first place, or to unequal wear—one brake drum may be dry and the other greasy—there may be a dozen disturbing factors, any one of which may absolutely negative the whole value of compensation.

The principal argument in favor of compensation is that it avoids the need for extreme care in brake adjustment. But if care is taken to adjust all brakes to an equal tension in the first place, the non-compensated brakes probably will give the most even effort at each wheel, for if after adjustment any one shoe be not doing its fair share of the work, the wear on it will be less than that on the other, and therefore as the other wears, the pressure on the one will become greater until it is doing its right amount of work. This is based, of course, on wear being proportionate to work done, which cannot be very far wrong.

This applies either to front or rear wheel brakes. The same argument can be extended to inter-compensation between front and rear wheel systems, although it probably is advisable to inter-compensate in order that any tendency of the rear brakes to throw off owing to spring movements on a poor surface should not throw the whole of the effort being applied by hand or foot on to the front brakes, which would be almost certain to lead to fore and aft pitching of the car, if to nothing worse.

It is quite possible truly to compensate the brake effort by attaching a balance link-work to brake plates or anchor pins so as to balance the brake torque. An effort was made to introduce such a system some eighteen years back, but although quite sound it was also found quite unnecessary and not worth the complication.

With compensated brakes, any failure means total failure of the system; with non-compensated brakes this is not of necessity the case.

Spring Load Due to Braking

When front-wheel brakes are fitted the loads imposed on the rear half of the front spring are very much increased; the maximum may quite easily reach double the maximum for the same vehicle without front brakes. This additional load is, of course, due partly to weight transference and partly to brake torque reaction. The additional tension load on the front half of the top leaf may not be particularly serious as far as the spring itself is concerned, but may affect the front horn if it has a big drop, though, as a general rule, the resultant of weight and brake pull on the front eye actually will favor the load on the horn.

Suitable design of the parts affected is a straightforward problem, but the point is of interest as illustrating the risks that are taken in fitting front brakes to an existing chassis without very careful consideration both of springs and spring fastenings, since a front suspension failure is very likely to lead to catastrophe. With quarter elliptic or transverse front springs, some form of torque member, of course, becomes essential.

The difficulty of finding the best location for rear brake rods, when the springs are made to act both as radius and torque members, is well known. It is largely a matter of experiment, although a fair approximation always can be made on paper. If the torque reactions either forward or backward tend to apply the brakes to any appreciable extent, the results are fatal. In the case of a front brake in which the actuating lever is carried on the axle, the difficulty is still more serious.

Location of Brake Rod Center

When the movements of the springs under loads normal to the spring are considered, we find that, within the limits of movement usually allowed on automobile springs, the path of the center point at the top leaf closely approximates a radius of two-thirds to three-quarters the length of the half-blade, and that the center of that radius is slightly offset from the center line of the main leaf in its flat position, on the same side as the center of the eye. That is to say, with the ordinary form of spring construction, front or rear, the center of the path of the mid-point of the top leaf is located slightly behind and above the fixed eye.

When a braking torque also is imposed, however, the radius remains approximately the same, but the center point moves round in the direction of rotation of the wheel. The rear brake-rod being located on the same side of the axle as the fixed eye, it is not a difficult matter to get the paths to approximately coincide, but on the front axle the fixed eye is usually in front and the rod behind and therefore the paths are of opposite curvature. At least one firm has solved the problem by bringing the brake rod forward to an intermediate lever close to the front eye, and thence back to the axle. Another solution is to operate the final brake rods transversely, as has already been done.

The great variety of methods of front-brake operation shows that this is one of the most serious difficulties the designer has to face.

It is in this matter of spring movements that the Perrot system scores heavily, since the operating lever is close against the frame and its movements due to axle displacement are therefore negligible.

While very strongly in favor of fitting brakes to all wheels, the one point, when all mechanical difficulties are overcome, on which the author feels most strongly is the comparison between independent and coupled or six-brake systems, in view of his own experience and of a study of the various exhibits at the last show. He cannot say a good word for the coupled system, under present conditions, at any rate. It is heavy, complicated, and costly as compared with independent brakes, and cannot possibly give the best holding power under all conditions, good and bad. When all vehicles are compelled by law to have brakes on all wheels, this opinion may need revision, and it will not be necessary to put some form of warning on the back of the car.

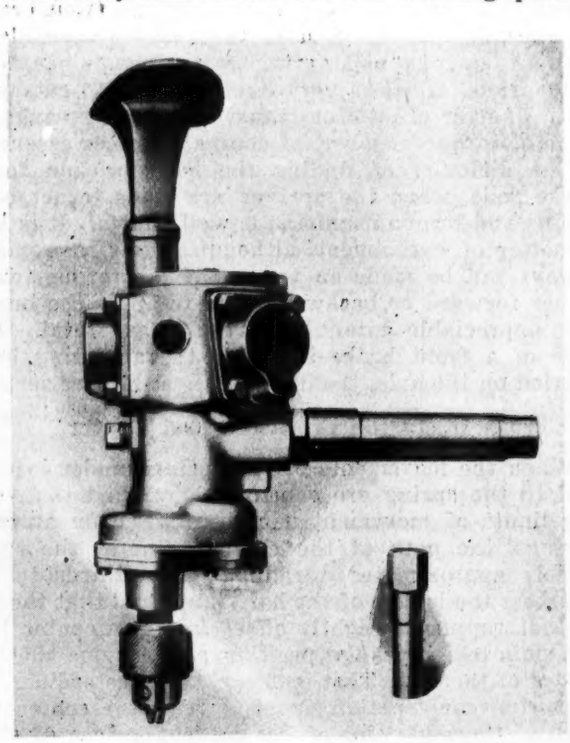
It may be argued that the coupled brake can be applied more quickly than independent brakes, but it is marvellous how quickly the hand finds the brake lever in a real emergency.

Pneumatic Drill Economical in Air Consumption

A NEW size light-weight drill has been brought out by the Ingersoll-Rand Co., New York. It is known as size D and is suitable for drilling up to 9/16-in. holes and tapping up to 5/16 in.

This is a light-weight unit which may be fitted with either breast-plate, feed screw or grip handle and so made adaptable for a wide variety of work. The features of this machine, which is similar in design to two other sizes brought out about two years ago, include a light aluminum case, steel bushings cast in all the bearing holes and the throttle hole; cast iron cylinders which are renewable, and a special three-cylinder motor. When required after extended service, any cylinder may be easily replaced and the motor made as good as new at small cost, it is claimed.

The three-cylinder motor has the rotating parts accurately balanced, eliminating vibration and reducing wear and tear. The drill is said to be economical in air consumption and cost of maintenance.



Ingersoll-Rand size D pneumatic drill

Mayari Iron Used for Cylinder Casting

AUTOMOBILE engine cylinders of the block type are one of the most difficult castings made in the iron foundry. These castings generally have thin walls, and in the air-cooled types thinner cooling fins, besides which there are thick sections, which combination always spells difficulty for the foundryman. The castings must be sound and show unusual strength; they must machine well, take a smooth finish, and must be sufficiently hard to wear well.

To meet these requirements some manufacturers have turned to Mayari iron, a natural alloy containing nickel and chromium in appreciable proportions. This metal is said to be particularly free from oxidation and to have a lower point of solidification and a "longer life" than the ordinary material of the iron foundry. The longer life improves the feeding of the castings when properly gated, in spite of the low phosphorus content. It is claimed that cylinders cast from this mixture show sound metal when cut at points with heavy bosses or thick sections. Motor castings made of a mixture containing 10 per cent of Mayari in one instance showed the following composition: Silicon, 2.660; phosphorus, 0.077; sulphur, 0.145; manganese, 0.600; total carbon, 3.020. A standard test bar cut from this iron showed a tensile strength of 36,740 lb. per sq. in., a transverse strength of 4250 lb., and a Brinell hardness of 223-229. In automotive practice, cylinders, cylinder heads and pistons are cast from Mayari mixtures.

Automotive and other applications of this iron, as well as the general properties of the iron, are discussed in a book entitled Bethlehem Mayari Pig Iron, recently published by the Bethlehem Steel Co. The effect on castings of nickel chromium as contained in Mayari pig iron is clearly brought out in two articles by Dr. Richard Moldenke, who conducted a comprehensive series of tests on this iron.

More Durable Car Finishes Are Making Their Appearance

Cellulose nitrate coating lasts as long as vehicle and retains a permanent luster, says prominent chemist. Better undercoats double life of ordinary varnish jobs. Black and color enamels, when dulled, are easily restored by rubbing and polishing.

SEVERAL interesting conclusions regarding the uses of paints and enamels were drawn by H. C. Mougey, of the General Motors Research Corp., in a talk on the Finishing of Automobiles before the Dayton Section of the Society of Automotive Engineers on March 25. Among the more important points brought out were the following:

1. It is possible today to get practically double the usual durability with the conventional priming-painting-varnishing system used on automobile bodies, by the use of better grade undercoats and finishing varnishes, with sufficient time for drying of the undercoats.
2. Both black and color enamel finishes can be restored to their original luster when dulled, by proper rubbing and polishing methods, their total life with this treatment being about equal to the life of the average car.
3. Durability practically equal to that of the mechanical parts of the car can be obtained with cellulose nitrate (Duco) finishes and the luster will be permanent, requiring but slight and occasional attention. In addition, the color choice is almost unlimited.
4. Several new painting and finishing methods now are being developed and will probably be widely used within the next year or two.

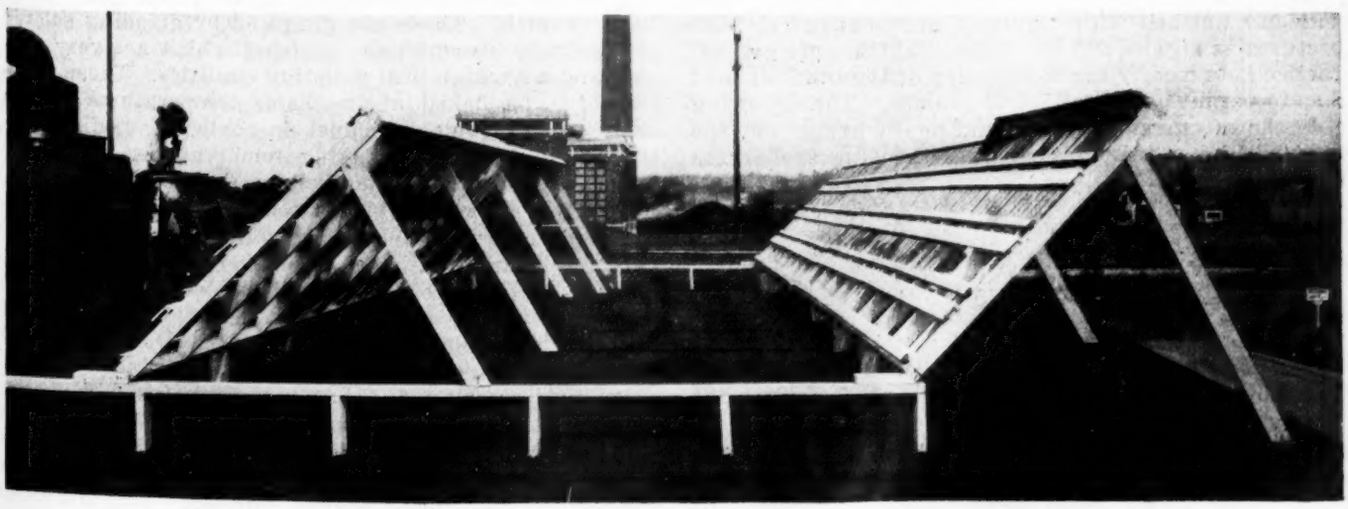
The speaker outlined the various finishing methods now used in the automobile industry and described the methods of manufacture of paints, varnishes and enamels. A summary of his remarks and points brought out in the discussion follows:

Current practice in the use of black enamels includes the application of from two to four coats of an asphalt base enamel over a smooth metal surface. Most of the lower priced cars use only two coats. Sometimes a small amount of lamp black, about 5 per cent by weight, is introduced into the first coat to give it greater covering ability, but this provides a dull black finish, with an appearance similar to that of hard black rubber. This is commonly called a rubber enamel.

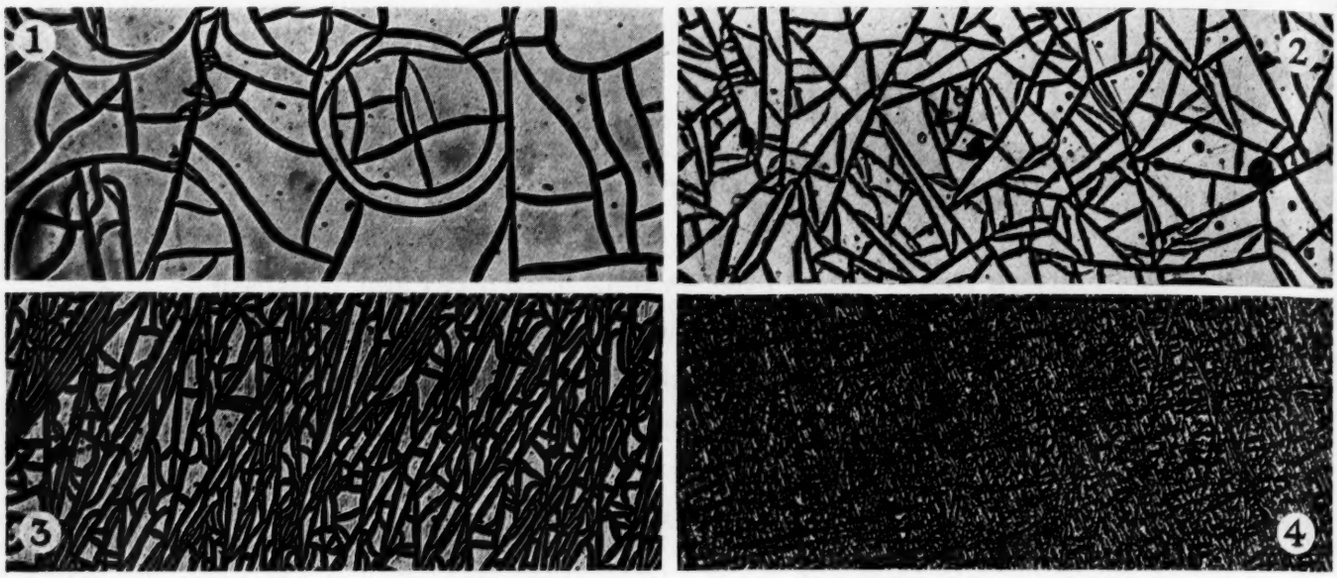
Metal Smoothness Basis of High Luster

High luster and smoothness of black enamel finishes depend upon the smoothness of the metal over which the enamel is applied, as this type of finish is obtained with materials which have very little "filling" property. Two coats are sufficient to give a satisfactory finish on such all-metal parts as fenders and hoods. On metal bodies, however, three coats usually are required to give the same grade of finish. This is because it is more difficult to obtain a smooth metal surface on the larger panels used in the bodies. Small surface imperfections and large shallow waves in the metal panels must be filled up by using one or more surfacing coats over the first or priming coat. Sometimes rubbing or sanding is necessary also to obtain a smooth surface for the finishing coat.

Black enamels as used on fenders, hoods and all-metal bodies usually are baked at temperatures above 350 deg. Fahr., the time decreasing as the temperature is increased. The relation between time and temperature



Racks accommodating 2000 test panels, which are exposed to the weather for as much as two years, are located on the roof of the General Motors Research Corp. laboratories



Micrographs showing minute surface cracks which develop in black enamel surfaces and are the cause of its loss of luster. The cracks, which are said to be invisible to the naked eye, develop gradually, as indicated by the photographs which are numbered in the order taken. The magnification is 100 diameters

in the drying of black enamels is clearly shown in the following outline of current practice:

Time (Hours)	Temperature (Deg. Fahr.)
4	320
2	350
1	400
½	445
¼	490
⅛	510

The above schedules cover drying or baking time only. In addition it is necessary to allow sufficient time for evaporation of volatile solvents in the enamel and to permit the material to flow out to a smooth, even film. This result is accomplished best by gradually increasing the temperature from that of the room where the enamel is applied to the baking temperature.

Bodies containing wood and glue in their construction usually are baked at somewhat lower temperatures to prevent injury to the wood or pulling apart at the glued joints. All such joints should be reinforced with mechanical fittings, bolts or screws if the body is to be subjected to high temperatures in enameling.

Bodies with properly reinforced wood frames sometimes are finished with regular fender enamel at temperatures as high as 400 deg. Fahr., but the more general practice is to modify the composition of the black enamel so as to permit baking at 250 to 375 deg. The following table shows current practice and again brings out the effect of higher temperatures in decreasing the drying time:

Time (Hours)	Temperature (Deg. Fahr.)
3	250
2	275
1	350
½	410

After long exposure black baking enamel will lose its luster, but it never fails in cracks large enough to be seen by the naked eye. This loss of luster is caused by a multitude of minute cracks, as shown in accompanying micrographs, in which the surface has been enlarged 100 times. Since these cracks are microscopic in depth, a very mild abrasive will remove them and uncover the black enamel underneath. This surface then can be polished in the usual manner, restoring its original luster. The treatment consists of rubbing out the minute surface cracks with rotten-stone and linseed oil, then polishing with linseed oil and a rag. With this treatment it is possible to keep a black enameled car polished so that it retains a good appearance for a number of years.

If the car is kept washed there is usually enough abrasion taking place in the regular washing operation so that the high luster finish on black enamel can be maintained for the life of the car.

Sometimes the durability of the finish is decreased by attempts to cheapen the cost of application. A solution of asphalt in gasoline or naphtha without sufficient drying oil to give toughness and elasticity can be applied in a short time or baked at a low temperature, but the durability of the resulting finish is low. Another method is to use a black pigment ground in a varnish which contains a large percentage of brittle resin, again without sufficient drying oils to give toughness and elasticity. This is really a black color varnish. It dries quickly and does not require high baking temperatures, but the finish is short lived.

A recent addition to the list of finishing materials is color enamels. These are produced by grinding colored pigments in transparent varnishes which are very durable and have high heat resisting qualities. These materials can be baked at the same temperatures as are used in baking black enamel on composite bodies. Attempts to use higher baking temperatures with color enamels have not been entirely satisfactory, as the varnishes will darken at higher temperatures.

Use of color enamels permits finishing a body in a very few hours, and gives a considerable range of color choices. Much greater durability also is claimed for this finish than is obtained by using color, rubbing and finishing varnishes in the usual way. Durability of a color enamel finish can be equal to that of black enamel, depending upon quality of materials used and the methods of mixing and application.

When this finish becomes dull its luster can be restored by the same method as that outlined above in connection with black enamel finishes. The oils used in the color enamel process tend to turn brown or green under high baking temperatures, so colors with these

bases are more likely to be uniform and durable. On account of this tendency it is impossible to obtain very light shades with the color enamel finishes.

The cellulose nitrate, as exemplified in the Duco process, which has been used commercially on a large scale only within the past year, makes use of materials which dry in the air very quickly, which can be rubbed to a smooth surface, and which give a very durable finish. As it is not necessary to bake this finish at high temperatures, practically any desired colors can be used. In the earlier applications of this material a finishing coat of transparent varnish was used to give surface luster. It was soon found, however, that the same luster could be obtained by proper rubbing and polishing of the Duco surface, and, as the durability of this material is many times greater than that of the best finishing varnishes, the use of the latter materials is not recommended with the Duco finish.

Duco Applied Over Dried Paint

Cellulose nitrate materials have poor adhesion when used directly over smooth metal, but a sand blasted surface gives good results in this respect. The best practice, however, is to apply the Duco finish over properly dried paint and varnish undercoats. Special preparation of the undercoats is required, as ordinary paints and varnishes, especially if not thoroughly dried, are attacked by the solvents used with the cellulose nitrate finishes.

For these reasons it is considered impractical to use the Duco finishes on older cars which previously were finished with the usual paints and varnishes, unless the old finish is entirely removed by sand blasting. Repairs to damaged sections of Duco finished cars can be made in case of accident, however, by applying the finish in the usual way.

The method which has given the best results to date with the cellulose nitrate finish is substantially as follows: Use a good baked undercoat to give the proper surface for the cellulose nitrate or Duco varnish; apply two or three coats of the latter by spray, allowing each to dry at moderate temperature; rub with pumice stone and water; rub with rotten-stone and linseed oil; polish with wax or conventional furniture polish.

Duco finish cannot be used successfully on wood at the present time, as this type of finish does not possess sufficient elasticity to allow for expansion and contraction of the wood with changes in moisture content.

It is believed that in many cases higher temperatures than commonly are used today for force drying could be used to advantage. It almost always is necessary, however, to dry the finishing varnish at a moderate temperature to prevent softening of one or more of the undercoats, which would result in injury to the luster of the finishing varnish.

Dust Causes Uneven Surface

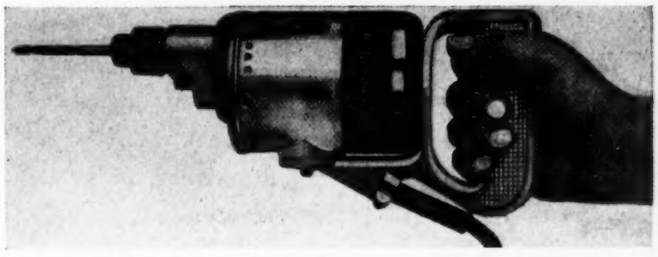
Even with these precautions the finish might show an uneven surface, due to dust specks, brush marks or other causes, if the color coat were applied over the surfacing coats with the idea of having the color coat serve as the finishing coat. In addition, a better luster usually can be obtained if the finishing coat is free from pigment. For these reasons it is common practice to rub to a smooth surface the coats directly beneath the finishing coat, and use for the latter a material free from coloring pigments. To make these coats dry hard enough to rub in the time available for drying, materials containing large percentages of brittle resins commonly are used. These have the desired qualities of quick drying and hardness, but also have short life when exposed to the weather.

The finishing coat of clear varnish is supposed to protect these color and rubbing varnishes of low durability, but the task is too great. The real reason for the short life of the ordinary automobile finish is the failure of the color and rubbing varnishes under exposure, which, as they crack, take the finishing varnish along with them.

This condition can be helped somewhat by the use of more durable color and rubbing varnishes. When these are used the life of the finish will depend more upon the life of the finishing varnish rather than upon that of the undercoats. This, of course, would necessitate more time for the air drying of the undercoats. If an attempt is made to shorten this time by force drying there is great danger of injuring the color. The use of such finishing varnish over durable color and rubbing varnishes enable the automobile manufacturer to at least double the life of the ordinary color, rubbing and finishing varnish job. This system is now in use by at least one manufacturer and is being seriously considered by several other makers of high-grade cars.

The adoption of the cellulose nitrate finish has had a very stimulating effect upon the paint and varnish industry. Several new finishing materials and methods are being developed and preliminary tests on some of these processes indicate that they should have remarkable durability. Public demand has brought about these developments, and it is reasonable to expect that as a result of the work already done and that now under way the life of automobile finishes will soon be materially lengthened.

Van Dorn Marketing New Drill



Van Dorn quarter-inch portable electric drill

THE Van Dorn Electric Tool Co. of Cleveland, Ohio, is marketing a new portable electric drill, termed Type DA-000, which takes drills of any size up to ¼ in. shank. This is a convenient drill of moderate size and light weight, with the drill chuck offset from the center line of the frame to facilitate drilling in corners. It is provided with a removable grip handle automatic switch, 10 ft. of cable, plug, and three-jaw chuck.

Its overall length is 11 3/16 in. and weight is 6 lb. It is designed to operate on 110 volt a.c. or d.c. circuit. No load speed is 1500 r.p.m. and speed at full load 800 r.p.m. Material and construction is said to be exactly the same as that used in larger sizes which have been made for many years. List price of this drill is $36.

WE are informed by the United States Ordnance Co. that errors occurred in the paper of G. L. Smith on "The Theory and Practical Advantages of Balanced Brake Action" which was abstracted in our issue of Jan. 31 on pages 219 and 220. On page 219, in the last line ahead of the subhead "Backing Latches Necessary" the word "equalization" should be "unequalization." On page 220, in the caption under Fig. 3 in the third line, "10 or 15 degrees" should read "2 or 3 degrees."

Exports of Cars, Trucks and Tires for

COUNTRIES	PASSENGER CARS								TRUCKS					
	Up to $500		$500 to $800		$800 to $2000		Over $2000		Up to 1 ton		1 to 2½ tons		Over 2½ tons	
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
Europe														
Austria	6	$2,748			4	$4,125								
Azores and Madeira Islands	1	392												
Belgium	30	11,834	22	14,838	59	68,139	15	$46,014						
Bulgaria														
Czechoslovakia														
Denmark	20	6,334	40	26,585	30	30,464								
Finland	3	642	4	2,633	6	7,771								
France	20	8,525					2	4,964						
Germany	21	8,896	4	2,704	16	17,652								
Greece	4	1,584	2	1,456	8	7,585	1	2,447						
Hungary					1	1,818								
Iceland and Faroe Islands														
Italy	222	62,080	13	7,115	1	1,360	9	30,082	206	$52,749				
Latvia					1	861	1	2,447						
Lithuania														
Malta, Gozo and Cyprus	16	5,410			2	2,082	4	13,600						
Netherlands	22	9,304	58	39,558	73	82,373	10	28,359			1	$1,007		
Norway	7	2,734	14	9,709	9	10,230	3	7,414	3	4,102	2	2,364		
Poland and Danzig					5	5,784								
Portugal	13	4,476	3	2,174	4	5,451	1	2,100						
Rumania	22	8,712	1	501	4	3,691	4	9,788						
Russia														
Spain	116	47,408	79	55,365	98	106,797	13	32,665	75	28,676				
Sweden	1	400	96	68,248	93	95,048	7	16,435	2	1,684	14	14,545		
Switzerland	2	786	10	5,929	39	49,873	4	8,613			2	2,190		
Turkey														
Ukraine	1	450												
England	119	31,578	121	71,269	175	180,590	12	31,401	20	19,607	69	49,825		
Scotland					1	1,900	1	2,973	2	1,758	2	2,494		
Ireland														
Yugoslavia, Albania and Fiume			2	1,324	1	997								
North and South America														
United States														
Canada	22	6,459	210	137,634	126	143,483	14	51,518	14	17,580	35	39,260	7	$15,679
British Honduras														
Costa Rica	3	1,092			2	1,722								
Guatemala					10	12,514					1	1,167		
Honduras	2	750			1	971								
Nicaragua	1	364	6	4,296	1	1,147								
Panama	8	3,211	5	3,228	12	15,280			2	3,477				
Salvador	6	2,500	7	5,056	28	30,904	1	7,952						
Mexico	179	57,831	83	59,016	37	41,726	7	26,773	6	2,569	13	15,141		
Newfoundland														
Barbados	15	5,460			2	2,268			3	1,432				
Jamaica	15	5,609	33	23,545	21	21,763			6	2,136			2	6,500
Trinidad and Tobago	25	9,772	2	1,432	1	853			5	1,780				
Other British West Indies	7	2,654	8	4,977	1	1,195			2	712				
Cuba	360	104,691	96	62,374	68	78,326	29	83,449	97	21,578	5	6,587		
Dominican Republic	25	8,640	12	8,497	9	10,943	1	2,900	3	1,020				
Dutch West Indies	1	296	1	512					1	370				
French West Indies														
Haiti	3	1,178	15	10,677	8	8,347								
Virgin Islands	2	730												
Argentina	851	393,083	194	134,693	351	361,894	17	49,470	18	24,780	7	12,991	19	35,354
Bolivia	1	304					2	4,626						
Brazil	92	27,224	90	63,619	128	129,813	5	10,987	13	4,096			1	2,676
Chile	32	8,760	41	28,469	33	41,533	4	10,045	26	19,436	2	2,386		
Colombia	14	4,268	2	1,286	14	16,110	1	3,040	17	7,317				
Ecuador	1	260			2	2,505			4	1,920	1	1,314		
British Guiana	6	2,048												
Dutch Guiana														
Paraguay														
Peru	74	26,872	51	35,826	15	19,344			35	25,770	12	15,037	3	9,020
Uruguay	148	43,811	174	114,181	47	59,507	1	3,348	227	60,714			2	5,382
Venezuela	56	21,139	31	23,077	30	28,554	4	10,500	18	6,492	2	2,333	1	5,460
Asia														
Aden														
Armenia and Kurdistan														
British India	131	59,026	22	16,452	45	43,086	3	7,246						
Ceylon	19	8,270	12	8,109	25	25,380	3	6,361	1	1,782	4	8,531		
Straits Settlements	55	24,942	22	15,634	9	9,390								
China	22	8,143	41	27,486	30	37,870	1	2,124	52	21,759				
Chosen	92	30,361	6	4,000	2	2,846			15	4,840				
Java and Madura	6	2,744	36	24,720	63	61,311								
Other Dutch East Indies			5	3,580	8	8,384								
French Indo China														
Hejaz, Arabia and Iraq	4	1,542												
Hongkong	5	2,074	4	2,844	3	4,744			5	2,435				
Japan	258	111,457	161	101,246	180	201,375	24	61,050	1,147	540,862	73	123,367	34	80,613
Kwangtung			3	1,854					10	3,160				
Palestine and Syria	28	7,056	16	10,775	8	8,063								
Persia	22	6,780												
Philippine Islands	48	17,250	71	51,651	54	56 165	4	10,600	32	13,482				
Siam					2	2 900								
Turkey	10	3,040							10	2,960				
Oceania														
Australia	1,300	494,593	1,532	991,316	1,090	1,125,?41	61	155,147	159	142,503	89	104,443	69	120,222
New Zealand	9	4,500	64	45,684	160	171 989	6	16,452	2	2,727	11	15,679	4	11,386
Other British Oceania	5	2,120			4	4,491								
French Oceania	3	1,176	4	2,843	1	1,000	1	2,250	2	1,500				
Other Oceania					1	1,059								
Africa														
Belgian Congo	3	1,040							8	2,848				
British West Africa	8	3,273	7	3,647	1	1,048			35	31,280				
British South Africa	24	10,798	256	184,960	459	464,473	3	7,599	3	5,501	8	10,447	1	4,400
British East Africa	23	9,606	16	10,579	5	5,057			2	1,012			2	10,000
Canary Islands	5	2,330	6	3,187	9	9,882					2	1,792		
Egypt	22	8,831	6	4,092	12	10,375	2	7,381						
Algeria and Tunis														
Other French Africa	7	1,855	3	2,400					5	1,780				
Italian Africa														
Liberia	1	296												
Morocco	1	458	4	2,940										
Portuguese East Africa	13	5,516	2	1,470	9	7,766			2	1,571				
Other Portuguese Africa	4	1,400	1	600	2	1,858			50	19,684				
Spanish Africa	11	4,098	1	501										
Total	4,734	$1,787,874	3,831	$2,554,373	3,768	$3,981,281	281	$781,020	2,345	$1,113,441	355	$432,900	145	$306,692

ELECTRIC VEHICLES		PARTS	TIRES						PASSENGER CARS		TRUCKS		PARTS	COUNTRIES
			Casings		Solid		Inner							
No.	Value	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value	
														Europe
		$247												Austria
		680,595	1,785	$13,671			1,736	$2,027	30	$24,896			$8,316	Azores and Madeira Islands
		314							1	1,251				Belgium
		21	40	949										Bulgaria
		532,211	3,992	45,425	33	$1,686	3,284	5,155					18,958	Czechoslovakia
		391	190	2,705			171	476	2	1,207				Denmark
		410,197	462	7,167			3	21	2	2,168			1,225	Finland
		22	39	450			89	252	1	2,084				France
		3,138	36	794	36	731	20	46	2	945				Germany
									3	3,542				Greece
		558	364	4,004			749	1,124						Hungary
		91,601	155	1,697			75	109						Iceland and Faroe Islands
														Italy
		130							1	819				Latvia
		1,363	20	140			28	42	1	480				Lithuania
		22,914	1,690	24,490	120	4,061	1,500	3,039	12	12,727			49	Malta, Gozo and Cyprus
		14,840	576	7,724	44	1,941	625	1,069	7	7,360				Netherlands
		34,564							15	13,226				Norway
		4,667	310	3,965	8	633	249	431						Poland and Danzig
		10,920	4	33			8	8						Portugal
		6,001												Rumania
2	$1,310	525,386	361	7,381	257	9,092	45	281	1	819			18,640	Russia
1	1,850	19,741	631	8,795	18	960	251	475					86	Spain
		2,516	204	5,111			126	397	8	5,810				Sweden
		2,039							3	2,461				Switzerland
		1,496	66	816										Turkey
		275,181	13,430	161,990	2,962	144,783	10,003	14,348	607	403,941	231	90,074	83,306	Ukraine
		317			341	9,481	12	75						England
		35,602	120	1,083			12	13						Scotland
		855	70	706	4	120	80	130	1	482				Ireland
														Yugoslavia, Albania and Fiume
									4	7,200			5,313	North and South America
1	1,675	1,545,262	1,139	22,238	189	7,853	1,389	5,372						United States
		499	14	131			20	21						Canada
		1,605	110	1,335	42	1,305	86	127						British Honduras
		1,186	150	2,959	2	53	104	249	2	2,085			30	Costa Rica
		2,932	44	420			32	53						Guatemala
		417	70	989			159	272						Honduras
		5,899	651	8,590	78	1,859	665	1,190						Nicaragua
		4,326	221	4,291	5	233	185	441	4	4,655				Panama
15	9,810	53,153	2,266	26,216	56	1,452	1,302	2,625						Salvador
1	3,280	885	3	94			4	16					83	Mexico
		2,257	14	109			12	14	2	1,304				Newfoundland
		11,537	406	4,767	75	1,632	417	739	3	3,888			130	Barbados
		6,288	384	4,178	14	512	272	451	1	985				Jamaica
		2,762	49	594	4	94	91	138	1	1,086			15	Trinidad and Tobago
3	49,342	77,705	3,182	42,952	235	9,028	7,140	12,529	6	7,399				Other British West Indies
		8,913	844	7,476	13	482	600	1,421						Cuba
		612	166	1,418			186	339						Dominican Republic
		752												Dutch West Indies
		4,602	70	1,526			137	245						French West Indies
		900	78	763			69	139						Haiti
		496,698	3,764	44,933	128	3,206	8,912	16,710	65	53,950			10,941	Virgin Islands
		1,426												Argentina
		348,918	1,340	11,342	37	1,013	3,190	4,803	2	2,182			24,572	Bolivia
		30,099	446	5,382	42	1,083	230	810	10	12,941			58	Brazil
		15,270	686	10,108	34	1,029	965	2,179	4	4,130			20	Chile
		4,085	169	2,489			191	422	1	1,261				Colombia
		2,252	54	725	14	386	29	166	12	7,683				Ecuador
		320	72	492			10	39						British Guiana
			50	428										Dutch Guiana
		18,815	391	6,438	40	1,622	869	1,677						Paraguay
		9,780	1,467	16,511	4	68	998	1,719	15	12,023			47	Peru
1	600	9,735	1,561	16,055			1,409	2,417	6	6,060				Uruguay
														Venezuela
		141							5	1,430			504	Asia
		139												Aden
		17,088	2,051	20,114	80	2,451	1,585	2,119	310	140,689	68	27,691	16,224	Armenia and Kurdistan
		4,661	317	3,388	38	1,069	134	282	11	5,505	29	10,821	60	British India
		11,505	552	4,770	42	784	398	849	15	11,777	4	1,696	30,259	Ceylon
		8,600	365	3,483	38	532	358	1,225	19	7,768			73	Straits Settlements
		17,183	320	2,796	10	100	100	102	1	635				China
		30,574	1,193	13,373	79	1,886	2,385	3,139						Chosen
		4,063	76	840	50	1,166	84	120	58	23,133	2	652	4,037	Java and Madura
		36												Other Dutch East Indies
		1,251												French Indo China
		2,686	266	3,446			256	514	5	5,390				Hejaz, Arabia and Iraq
7	8,451	225,956	10,983	130,266	2,996	57,179	15,431	31,230	40	20,810	120	56,035		Hongkong
		403	40	400										Japan
		5,218	166	2,315	2	50	35	83						Kwangtung
			40	382										Palestine and Syria
		13,504	3,728	42,207	475	14,022	1,900	3,371						Persia
		593	20	725							14	4,564	2,074	Philippine Islands
		194												Siam
														Turkey
		257,605	2,085	23,303	692	24,089	1,281	2,058	1,558	476,420	921	304,506	89,581	Oceania
		60,989	2,619	31,586	180	8,862	644	1,457	938	425,749	360	114,630	21,210	Australia
		1,324					24	36					2,683	New Zealand
		1,056	3	45										Other British Oceania
		198	45	505			72	70						French Oceania
														Other Oceania
		5,164	75	2,000			167	460	36	10,252	15	4,890	4,853	Africa
		82,694	1,992	24,175	23	867	2,036	3,844	231	143,330	8	2,816	2,079	Belgian Congo
		5,262	531	4,281			224	376	19	6,455	3	980	377	British West Africa
		2,288	290	2,598	31	830	62	142						British South Africa
		5,444	172	1,850	114	2,949			10	4,798				British East Africa
		3,300	100	1,427										Canary Islands
		1,127	6	53					2	1,207				Egypt
		70												Algeria and Tunis
		50												Other French Africa
		1,472			52	1,356								Italian Africa
		3,205	10	215										Liberia
		8,623	45	1,069			176	435	3	1,395				Morocco
		8,518			42	897								Portuguese East Africa
														Other Portuguese Africa
														Spanish Africa
31	$76,348	$6,139,901	72,426	$866,651	9,779	$325,487	476,091	$138,753	4,094	$1,899,793	1,775	$619,355	$345,803	Total

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Postal Bills Demand Attention

BILLS now before Congress call for an increase in salaries of postal employees which would require the expenditure of an additional $150,000,000 for the postal service. The presence of a deficit in this department last year indicates that the additional sums required if these bills were to pass would have to be made up from a draft on the general treasury. This inevitably means less chance for a substantial reduction of taxes.

The expenditure of money in itself is not to be decried if it is to bring greater efficiency and to pay to employes fair wages which are their due. Many postal employes are grossly underpaid; there can be little question about that. But it is a long step from such an admission to advocacy of the particular bills which are being proposed at the present time.

In a letter to the chairman of the House Committee on Post Office and Post Office Roads, Postmaster General Harry S. New points out that a large number of postal employes are not covered by the present proposals made in Bills H. R. 631, 5552 and 4123, and that the bills do not comprise a thorough and comprehensive plan in which all factors are considered.

If these bills should pass, hundreds of postmasters would draw smaller salaries than some of their subordinates, and employes in small towns would get the same wages as those in big cities, regardless of the modifying conditions which always are to be considered in fixing compensation. To get a proper adjustment of salaries for postal employes Mr. New's proposal that the question be delegated to a Congressional Committee for complete investigation seems a good one.

The present bills are very likely to pass unless a sufficient volume of protests are received in the near future. If they do, industry will pay the bill without getting adequate benefits.

"Tell the Truth and Shame the Devil"

NEWSPAPERS, especially those devoted principally to business and finance, are making an earnest and commendable effort to get at the actual facts about the status of the automotive industry. This serious study of the situation is the more noteworthy because it is so unusual in respect to the automobile trade. In other days they were rather prone to accept as fact the most exaggerated fables. They are resisting vigorously the spread of the propaganda of pessimism for which certain interests in Wall Street are chiefly responsible and they are entitled to whole-hearted cooperation in their efforts.

The automobile industry has nothing to hide and it should tell the truth about its affairs, but altogether too often in the past it hasn't. One of its traditions seems to have been that no statement must be made for publication in the daily papers unless it was highly optimistic. The theory applied with equal force when business was good and when it was bad and the statements made were much the same.

Motor car manufacturers were among the last to admit in 1920 that the bottom was dropping out of business. Some of them continued to paint rosy pictures even when their factories were virtually idle. The result was, quite naturally, that when these perversions of fact became generally known, bankers and others refused to believe what they had to say even when they held religiously to the exact truth.

Production in the Detroit district unquestionably has declined. The reasons are perfectly obvious and in no sense alarming. The sooner the public understands them the better it will be for the public and the industry. The bottom hasn't dropped out of business and it won't, unless the propaganda of pessimism wins enough adherents and destroys confidence.

The exact truth will do more than anything else to inspire confidence. There are times in every industry when production runs ahead of demand, and that is what has happened in ours. In spite of that fact, however, it is exceedingly difficult to find a manufacturer who will admit that there has been the

slightest curtailment in HIS schedules, that HIS sales are not keeping pace with production, or that HE does not propose to increase his output next month.

Some of these assertions may be made with mental reservations, but the mental reservations don't get into print. "Technical denials" and evasions of the facts are of little avail in these days of "pitiless publicity." Whenever we feel it would be unwise to tell the exact truth about our industry, let's say nothing, for a discreet silence will not destroy confidence in our veracity. Up to this time, however, there is nothing whatever to conceal.

A Victory for Highway Beauty

BEAUTY has taken a fall out of commercialism in America and a number of firms connected with the automotive industry have had a part in the victory. Sinclair Lewis may portray the modern business man as a being without aesthetic sense and other writers may accuse him of lacking a soul, but every now and then some very practical action tends to disprove their assertions. In announcing discontinuance of billboard advertising along the highways, several prominent oil, tire and automobile companies have exhibited a high degree of appreciation of the feelings of motorists and of the natural beauty.

It is certain that the average driver will get more pleasure out of touring if he can come up a fine highway to the top of a mountain and drink in the full inspiration of an unobstructed view of fertile valleys and rolling hills than if he has to crane his neck around the corner of billboard to snatch a hasty glimpse of nature's beauty. Probably the companies involved could have made no move which would be more popular with a majority of car owners.

The automobile already has accomplished much toward broadening the life and viewpoint of the average man by giving him an opportunity to spend more time in the great outdoors and thus intensify the development of his aesthetic and spiritual life. Its influence in this field was brought out vividly by the school girl who won the Firestone prize essay contest last year when she showed how good roads and motor vehicles had brought new hope and new spiritual development to the people of the Kentucky mountain section which had been her early home.

The beneficial effects of driving increase in proportion to the beauty of the areas traversed and the removal of objectionable advertising signs from highways will be a long step in the right direction.

Standard vs. Special Buses

THE chief engineer of a large organization which includes buses among its automotive products recently stated that his company, which had entered the bus field with a standard line, is about to make a radical change of policy. Instead of putting out the buses on standard truck chassis, transportation and bus engineers will make a survey of the particular conditions to be met in the individual installation and design the bus accordingly.

According to this engineer, a bus which will meet the requirements of school service in mountainous districts probably will be quite unsuited for urban service even in the smaller towns whether the ground is level or not. The number of stops and starts, the distance covered, the importance of the time factor, the number of passengers to be carried and the question as to whether a combined freight and passenger load or a passenger load alone is expected are all factors, he claims, in the design. These considerations determine the size of the engine, the design of the body, the type of transmission gearset, the reduction in the gearbox and in the rear axle and, in fact, so many variables that the ideal bus never can be built for a given condition unless designed specially.

These ideas are worthy of a great deal of thought by bus designers and executives. It is not so much a question of engineering as of economics. Reduced to its simplest terms the problem becomes a considera tion of which type of bus makes the most money during the course of its life. If the profits from the special bus or truck more than pay for its extra cost, then it pays to buy the special vehicle. This may seem simple, but the cost calculations may not prove to be so easy to make, although well worth while for any organization that expects to invest its capital in a bus operating business.

Trade Associations Not Worrying

"OLD established trade associations which have been operating along the right lines for years are pursuing the even tenor of their way and paying no attention whatever to the personal opinions of the attorney general or anyone else."

This statement summarizes the views of the Fabricated Production Department of the Chamber of Commerce of the United States in respect to the legality of trade association activities as voiced at a uniform cost accounting conference held in New York last week.

That is exactly what the automotive trade associations are doing. They have violated neither the letter nor the spirit of the law.

Nelson B. Gaskill of the Federal Trade Commission took the same view of the situation when he stated, as his personal opinion, that trade associations must "determine as accurately as they can the legitimate field of proper endeavor, and having so taken counsel, should, without hesitation, resting upon their legal advice and the clear consciousness of the propriety of their efforts, proceed without fear, willingly inviting the test of the courts' consideration of their conduct."

Incidentally, the Government authorities have accepted, in principle, the contention that the study of manufacturing costs, the detection of errors and the improvement of methods in accounting is educational in nature and therefore a legitimate undertaking for any trade association.

SPOTTINESS MARKS SALES CONDITIONS

SALES slowed up in a good many districts in March. Conditions are spotty throughout the country, so that it is difficult to determine a general tendency from the summary of the different sections. The used car market is just as varied as that for new cars, some sections showing a very large stock of unsold used models, others reporting unusual lack of such stocks.

Trucks continue to move satisfactorily and generally in increased volume.

The strong features of the market are:

(1) Continued good sales reports from districts which take an important percentage of the total output.

(2) Generally good business conditions in many sections of the country.

(3) Better used car situation in some of the important centers.

(4) Manufacturers' more careful study of field conditions and closer control of production.

The weak features of the market are:

(1) Slowing up in sales in a larger number of districts throughout the country and smaller prospects of spring business in these sections.

(2) Unfavorable business and employment conditions in some sections of the country.

(3) Backing up of used cars in some districts.

(4) Spotty condition of sales.

The general situation remains good for the sale of a large production of automobiles. It is not quite as favorable as it was a month ago.

The unfavorable features have become a little stronger and the favorable features not quite so strong.

The Southeast and the Far West show the weakest possibilities, with New England next.

The conditions in agriculture have affected the Far West seriously and the textile business has hampered New England.

Conditions in the chief distributing centers as reported by correspondents of AUTOMOTIVE INDUSTRIES are as follows:

Weather Held Responsible for Backward Sales in March

Indianapolis

INDIANAPOLIS, April 1 — March sales for Indiana were off at least 30 per cent as compared with last year. With some popular lines there was a loss of 40 per cent. Weather conditions made gravel roads impassable to country travel, seriously retarding rural sales.

The prime cause for the sales slump is placed on the weather by distributors and dealers both in city and country districts. With a heavy snow storm the second week of the month, a record fall for the 1923-24 season, and another one the following week of the same proportions, and hardly a clear day all month the expected buying did not develop. Stock of cars were never higher for several years. All dealers had expected a record month due to new car interest and had prepared for it, but it did not come. The used car is a decided menace in view of the large stock of new cars on hand. Clear weather and dried roads will help April sales, for hundreds of orders for April deliveries are already booked.

Out in the State dealers particularly are optimistic for good business during the balance of spring. They insist general conditions are better than last year.

Cleveland

CLEVELAND, April 1—The retail and wholesale automobile business in the Cleveland territory slowed up somewhat during the first half of March, but gained during the last half of the month.

Stocks of used cars are 40 per cent lower than they were last year and many dealers are complaining that they cannot get a good variety of cars on trade-ins. Inclement weather during March is said to be responsible largely for the slow-up the first half of the month.

Weather conditions improved the last half of the month and with that improvement came the usual increase in sales. Payments are being maintained by purchasers on the installment plan in about the same proportion as a year ago.

Dealers are taking new cars as fast as they come and the volume of stocks has not caused alarm here.

Banks in Cleveland report steady growth in March of deposits, while factories increased their workers.

Cincinnati

CINCINNATI, April 1—The volume of sales made during March by Cincinnati dealers was not as large as anticipated, although business held up to a fairly good standard. The weather experienced in this city throughout the past month proved to be a severe handicap to sales.

Prevalence of rain or snow almost continuously the last four weeks had its retarding effect on the sale of automobiles locally and the real opening of the spring selling season was deferred as a result. Reports received by local distributors from dealers in smaller cities and towns in Cincinnati territory relate the same story.

The outlook for April sales, however, is most encouraging. Much of the business which was expected to be placed during March will undoubtedly swell the sales volume during the coming month. All of the dealers are optimistic in their predictions and believe that the next four weeks will bring splendid business.

Dealers are well stocked at present and are equipped to meet the needs of their customers with prompt deliveries. Dealers, however, are urging the public to place orders now, because the rush that is expected to develop during April and May will probably delay deliveries.

Sales of trucks were exceptionally good during March and for the first three months of this year show a large increase over the same period in 1923.

Louisville

LOUISVILLE, KY., April 1—While March business was not as good as it was last year, the Louisville trade is not at all discouraged, realizing that weather conditions have been very unfavorable and that the same conditions of slow business prevail throughout the country.

Dealers here anticipate a considerable opening up of business as soon as the weather becomes favorable. This expectation is based on the unusually good business of January and February. The slowing up that occurred last month may bring more conservative policies regarding trade-ins.

Four or five of the more popular makes are an exception to the general rule of slow business during March. This limited number of dealers, all of whom are in the medium and high priced field, report a satisfactory number of sales and all clean business, with very little dead weight in the shape of used cars.

Buffalo

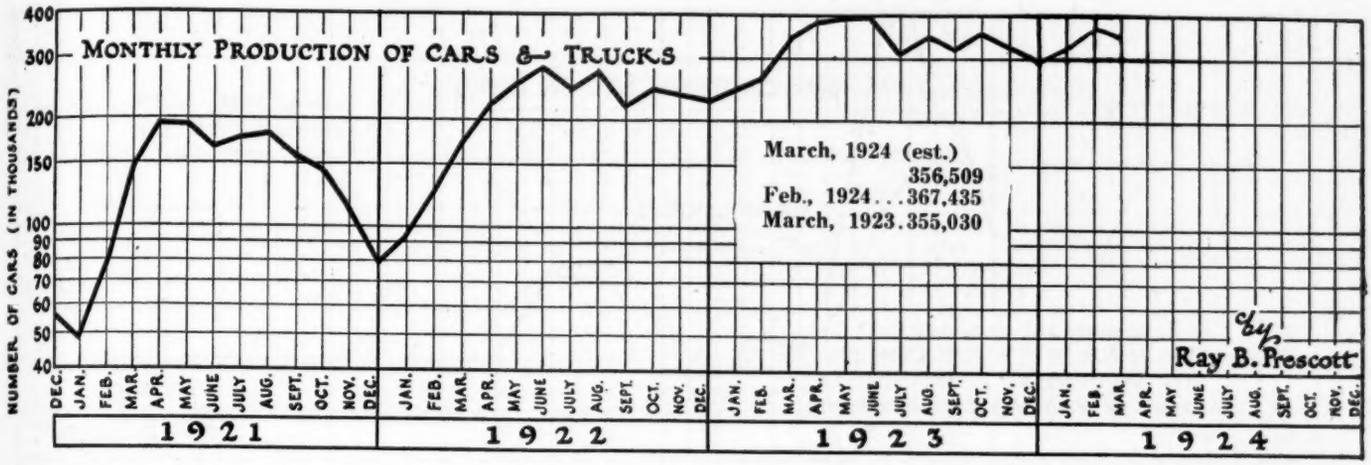
BUFFALO, April 1—Buffalo dealers are more heavily stocked with new cars than they were a year ago. They are not looking forward to a slump. They believe they will have a good spring and early summer trade. Few of them are optimistic enough, however, to expect it will match up with what the factories seem to think it will be.

The used car situation is said to be better than ever before.

Delivery of new cars was slower during March than it was in the corresponding month of 1923. This was attributed largely to the cold weather that prevailed here during the greater part of the month just ended.

(*Conditions in other cities on page* 787)

MARCH OUTPUT ESTIMATED AT 356,509



Total for Quarter, 1,040,092 Against 875,503 Last Year

NEW YORK, April 3—Shipping figures compiled by the National Automobile Chamber of Commerce place March production of cars and trucks at 356,509, as compared with 367,435 in February. While this is 3 per cent under the second month of the year, it exceeds March of last year by a fraction under half of 1 13.9 per cent.

Although there is only 3 per cent difference between production in February and March of this year, it must be remembered that March had twenty-six working days as compared with twenty-three in February. Figuring on the daily production averages of the two months, the slowing up of the industry in the last half of March can be seen. In February this daily average was 15,932, a record for the industry, while in March this average dropped to 13,712 daily. This is a falling off of 13.9 per cent.

March, however, is not a disappointing month to the manufacturers, who feel that the weather has been largely to blame for present conditions. They believe that with the coming of real spring stocks on hand will rapidly dissipate and that the expected big business will materialize. The curtailing of production was a cautionary step that has met with the approval of all parties concerned.

With the report in for March, it is now possible to compare the first quarter of this year with the corresponding period in 1923. The count shows that for the first quarter this year the industry was traveling at a pace which if maintained will result in the smashing of the production record made in 1923.

Slight Increase Is Reported in Production of Cars and Trucks Last Month as Compared with March of Last Year

NEW YORK, April 3—Shipping returns received by the National Automobile Chamber of Commerce indicate the production of 356,509 cars and trucks in March. This is a decrease of 3 per cent from February's total of 367,435, but an increase of 0.417 per cent over March, 1923, when the total was 355,030.

The following table gives the statistics for the first quarter of 1923 and 1924:

	Output		Carloads		Driveaways		Boat	
	1924	1923	1924	1923	1924	1923	1924	1923
January	316,148	243,539	46,559	35,223	40,976	30,031	1,018	728
February	367,435	276,934	49,219	36,165	48,300	43,613	1,100	882
March	356,509	355,030	.....	.....	.....	.....	....	...

Factory shipments and output for the other months of 1923 and 1922 follow:

	Output		Carloads		Driveaways		Boat	
	1923	1922	1923	1922	1923	1922	1923	1922
April	382,695	219,864	46,095	31,334	60,467	22,381	5,027	2,960
May	394,088	256,559	45,397	33,416	62,346	28,827	12,812	7,406
June	378,507	289,351	40,281	34,230	59,099	33,857	13,492	7,737
July	327,993	247,132	32,623	29,116	46,837	28,100	10,131	7,030
August	345,202	274,184	38,319	32,817	45,958	36,768	10,053	10,104
September	327,549	207,156	35,986	26,335	39,653	30,177	8,463	8,118
October	365,189	239,361	42,236	27,100	37,947	35,203	7,663	7,605
November	312,993	237,301	38,133	27,232	32,859	27,376	6,413	5,070
December	303,182	228,364	34,984	27,244	27,608	26,743	4,000	1,307

Motor vehicle production segregated as to cars and trucks is as follows:

1923	Cars	Trucks	1923	Cars	Trucks
January	223,819	19,720	September	298,911	28,638
February	254,773	22,161	October	335,023	30,166
March	319,770	35,260	November	284,923	28,070
April	344,639	38,056	December	275,439	27,743
May	350,410	43,678	1924		
June	337,362	41,145	January	287,302	28,846
July	297,330	30,663	February	336,363	31,072
August	314,373	30,829	March*	321,509	35,000

*Estimated

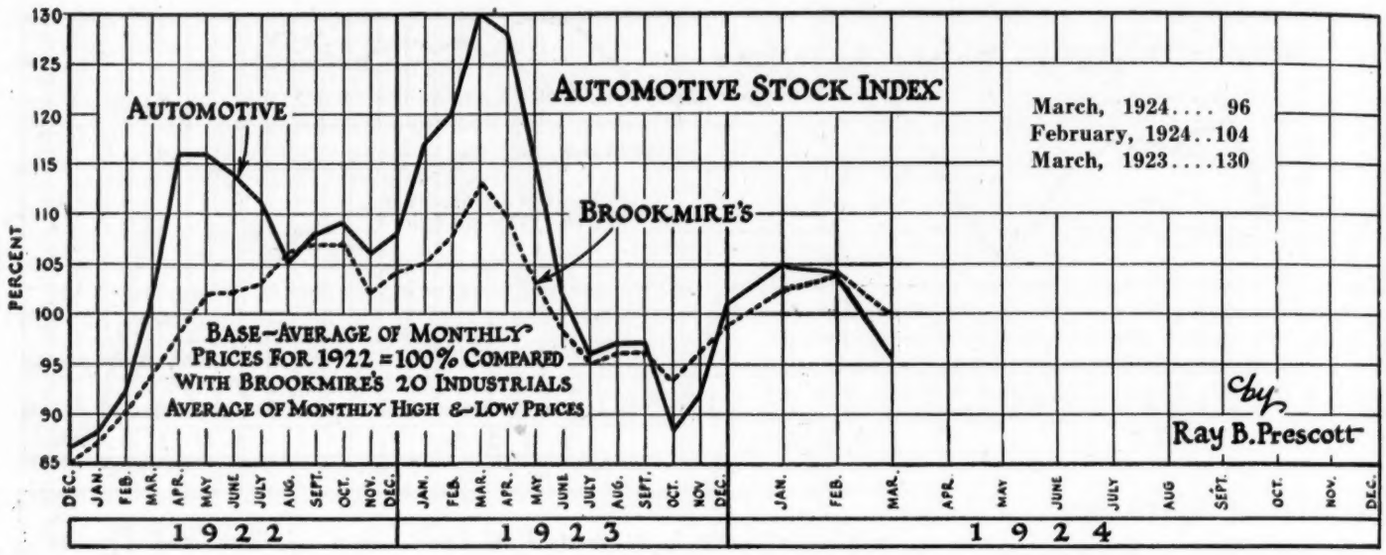
For the first three months of this year there were 1,040,092 cars and trucks manufactured as compared with 875,503 a year ago, an increase of 18.8 per cent.

NEW YORK CONDITIONS

NEW YORK, April 1—Although exhibiting no marked indications of a spectacular upward swing, sales in the metropolitan district are accumulating a steady spring momentum. The weekly reports of new car registrations issued by Sherlock & Arnold show deliveries being stepped up weekly in all price classes.

Early April business was expected to suffer a slight setback because of the heavy snowstorm that ushered in the month and the cold weather during the week. However, business booked for late April delivery is expected to make the month one of the best of the year. Used car sales are advancing with the new cars as the spring demand unfolds.

SHARP DROP IN AUTOMOTIVE STOCKS



The drop in automotive stocks as indicated in the above chart is interpreted to indicate a lack of confidence on the part of the buying public of the ability of the industry to continue its present production pace

New York Exchange

	Feb. 5	Mar. 4	Apr. 1
Ajax Rubber	8¾	8	6¾
American Bosch	34½	34	26½
American-La France	10⅝	11	10½
American-La France pfd.	94½	95	....
Case, J. I.	25	24	....
Case, J. I. pfd.	75	67	49
Chandler	64¾	59¾	48⅞
Continental Motors	7½	7	6⅞
Eaton Axle & Spring	23¾	23	17
Electric Storage Battery.	61¾	62	58
Emerson-Brantingham	2	1¾	1½
Emerson-Brantingham pfd.	13	8	10
Fisher Body	175	205½	205½
Fisher Body pfd.	97½	99½	99
Fisk Tire	9⅛	8¼	7¼
Fisk Tire pfd.	....	....	54½
Gardner	5¾	4⅞	....
General Motors	16	14¾	14¼
General Motors pfd.	82	82	....
General Motors 6%	82⅜	81¾	81¾
General Motors 7%	98½	99⅛	95
Goodrich, B. F.	24½	21⅞	20¼
Goodrich, B. F. pfd.	76	76	71¼
Goodyear Tire pfd.	42¾	41¾	43⅛
Goodyear Tire pr. pfd.	91	92⅜	90
Gray & Davis	8¼	6½	5¼
Hudson Motor Co.	27¼	26½	26¼
Hupp Motor	16½	16	13⅝
Indian Motorcycle	25	20½	19½
International Harvester	86¼	84¾	83
International Harvester pfd.	107½	106½	....
Kelly-S Tire	28½	22¼	17
Kelly-S Tire 6% pfd.	73	72½	55
Kelly-S Tire 8% pfd.	83	66	45¾
Kelsey Wheel	97	100	86
Kelsey Wheel pfd.	106	106	....
Keystone Tire	3¼	2⅞	2
Lee Rubber	14⅛	12½	11¾
Mack Truck	89	89⅜	81
Mack Truck 1st pfd.	87	98	96¼
Mack Truck 2nd pfd.	89	88¾	88
Marlin-Rockwell	11	11½	12¼
Martin-Perry	34½	33½	35
Maxwell Motors A	53	51½	43⅜
Maxwell Motors B	14¾	14⅞	11⅞
Moon Motors	25¾	25¼	23⅛
Mullins Body	14¼	12	10
Mullins pfd.	89	89	....
Nash Motors	106	109	100¾
Nash Motors pfd.	98	100	99¾
Ohio Body & Blower	3¼	2½	1¾
Packard	11¾	11⅝	10½
Packard pfd.	94	91	93¼
Parish & Bingham	14	14¼	14⅞
Pierce-Arrow	10⅜	9¾	8⅞
Pierce-Arrow pfd.	28	25	21½
Pierce-Arrow pr. pfd.	66¾	68	43¾
Reynolds Spring	18	16½	15
Spicer Mfg. Co.	16½	13¾	13
Spicer Mfg. Co. pfd.	88½	87	85
Stewart-Warner	94	89	77½
Stromberg Carburetor	80¾	78⅝	64½
Studebaker	105	101⅜	93¼
Studebaker pfd.	110	110¼	111
Timken Roller Bearing	40¾	39	36
U. S. Rubber	38¼	33⅜	30¼
U. S. Rubber 1st pfd.	86½	82½	79½

Detroit

	Feb. 5	Mar. 4	Apr. 1
Auto Body Com.	1½	2	....
Columbia Motors	....	15/16	½
C. G. Spring Co.	....	....	7
C. G. Spring Co. pfd.	....	....	6
Continental Motors	7½	7¼	6⅞
Edmunds & Jones	42	40	39
Edmunds & Jones pfd.	....	93	92½
Federal Truck	....	21½	22
Ford of Canada	464	448	455
Gen. Al. & Brass Mfg. Co.	....	....	14¼
Hayes Mfg. Co.	2½	2½	1⅞
Motor Products	....	75	65
Motor Products pfd	....	47	48½
Motor Wheel	10¼	10	9½
Packard com.	11⅞	11½	10¼
Packard pfd.	93½	91½	93¼
Paige-Detroit	17	17¾	15
Reo	18¼	18	16⅛
Timken Axle com.	7⅛	6⅜	5
Timken-D Axle pfd.	85	....	....

Chicago

	Feb. 5	Mar. 4	Apr. 1
Bassick Alemite	46¼	....	32½
Borg & Beck	29¾	....	....
Continental Motors	7⅝	7⅛	6¾
Earl Motors	⅛	....	....
Eaton Axle & Spring	24	23¼	....
Gill Mfg. Co.	17¼	17	....
Hayes Wheel	52½	....	....
Hupp	16¾	15¾	....
McCord	37½	....	32
Reo	18¼	....	16⅛
Reynolds Spring	18	....	....
Stewart-Warner	95	89½	77¼
Yellow Mfg. Co.	92	81	81¾

Philadelphia

	Feb. 5	Mar. 4	Apr. 1
Electric Storage Battery.	61	....	58

Cleveland

	Feb. 5	Mar. 4	Apr. 1
Firestone	....	70	68
Firestone 6%	....	92½	96
Firestone 7%	....	89¼	87
Goodyear	10¾	10¾	10
Goodyear pfd.	....	42	....
Jordan pfd.	93½	96½	....
Miller Rubber	....	66	65
Miller Rubber pfd.	....	96½	97
Peerless Motors	....	22	18¼
Stearns, F. B.	....	17½	15

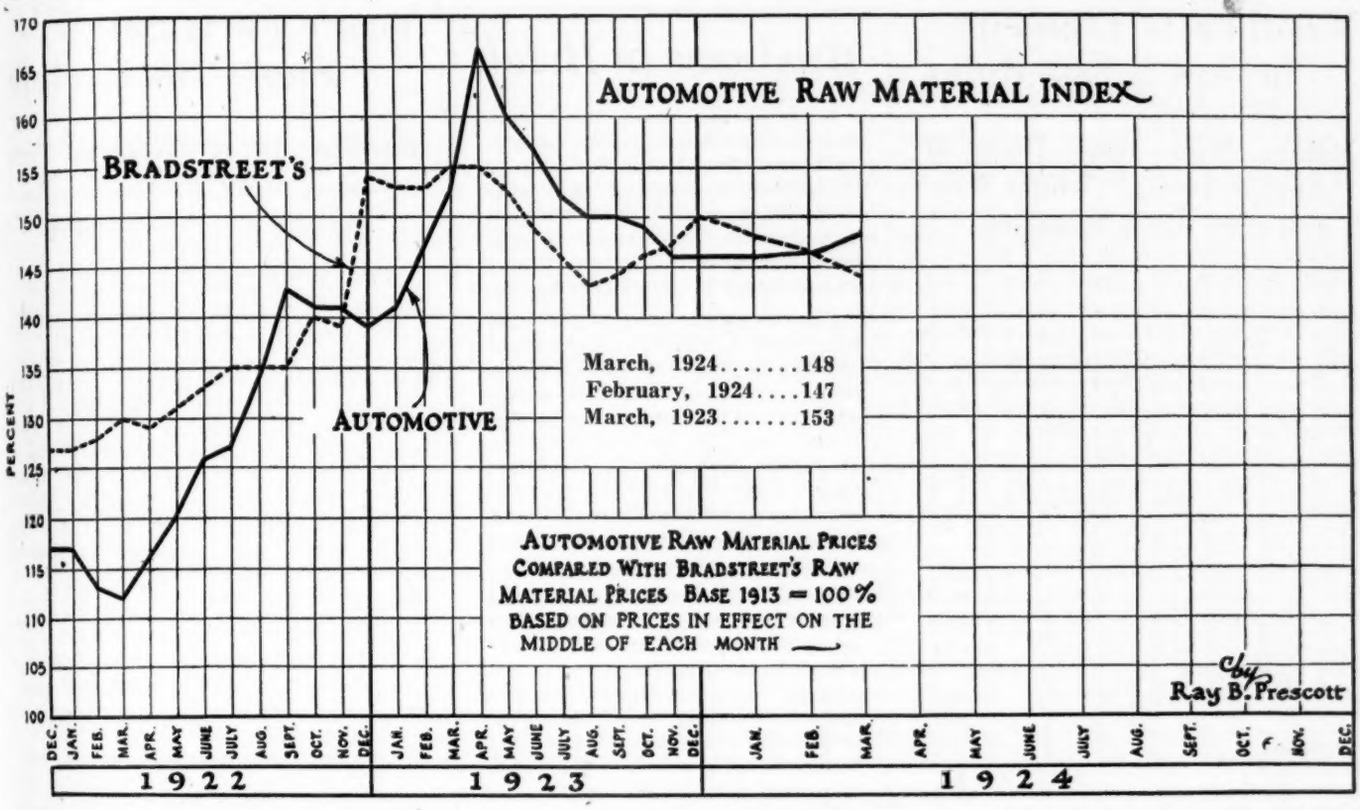
Boston

	Feb. 5	Mar. 4	Apr. 1
Gray & Davis	8	7	....
Greenfield Tap & Die	14¼	14¾	13¾
Hood Rubber	50½	50½	46
General Motors	....	14¾	....
Fisk Rubber	....	58½	....

New York Curb

	Feb. 5	Mar. 4	Apr. 1
Bassick Alemite	....	....	32½
Cleveland Motors	....	20	19¼
Durant Motors	31¼	27½	20¾
Durant Motors of Ind.	....	8	....
Dupont Motors	....	....	1
Edmunds & Jones	....	40½	....
Ford of Canad	464	452	456½
Goodyear Tire & Rubber.	10⅞	10	10
Hudson pfd.	....	17½	20⅞
Jordan Motor Car	....	31¼	26½
Motor Products Corp.	77	....	....
Motor Products pfd.	47¼	....	....
Paige-Detroit	17¼	18	15½
Peerless	....	22½	19
Reo	18¼	17⅞	16¼
Stutz Motors	11⅞	10¾	8
Standard Motors	....	....	2⅞
Timken-D Axle	....	6⅜	....

COST OF MATERIALS MOUNTS SLIGHTLY



The slight increase shown is due principally to the increase in prices of hard woods, which may be attributed to the heavy demands of the building trades

Last Month's Business Satisfies Trade in Some Cities

Atlanta

ATLANTA, GA., April 1 — Early spring business among the Atlanta dealers has been fairly active, reported somewhat better than last spring, but not as brisk as the dealers had anticipated a month or two ago. As a whole, however, the trade in Atlanta is well satisfied with conditions, and particularly so over the outlook for the next two or three months.

Undoubtedly the vast volume of trade from a comparative standpoint will be among the dealers in the smaller communities dependent on rural custom.

At present retail deliveries in the larger cities of the district appear to be a trifle slow, as buyers are holding off until later spring. Dealers, however, are generally advising prospective buyers to purchase their cars as soon as possible, as higher prices seem in prospect, and many are accepting the advice.

The used car situation in this section is as serious as ever, perhaps even a little more so.

Chicago

CHICAGO, April 1—March proved a very satisfactory month to the Chicago automobile trade, despite its offering of adverse weather conditions. Sales, on the whole, averaged up well, falling short of tabulations for the same month of last year in rare instances and exceeding those records comfortably in a good many cases.

Generally speaking, it might safely be said that the element of net loss was an absent quantity, for where a slump was noted in the sales of certain models, increased turnovers for others made up or more than made up for the deficit.

Demand for closed models in this territory continues to grow. In some instances such sales have been running only slightly behind the sales of open models and in the absence of any particularly special effort to push open models.

It is gratifying to observe the facility with which used cars have been moving. This, for one thing, possibly reflects prosperity among wage earners, laboring men and members of the younger generation being conspicuous buyers. With a period of spirited new car business, however, it is to be expected there will be a proportionate increase in trade-ins and, therefore, larger used-car stocks to dispose of. This means that the dealer who shares in the fruits of an eager new car market will have to redouble efforts in the movement of used cars taken in.

Pessimism in the Chicago territory just now is a negligible factor.

Detroit

DETROIT, April 1—Heavy deliveries of cars in the last ten days of March are expected to bring total local deliveries for the month slightly higher than March of last year, which means deliveries will be approximately 7000. February deliveries of 4585 ran about 50 per cent better than the same month last year, but beginning with March and running through the rest of the year delivries in any month are not expected to show increases of better than 10 to 15 per cent.

March shows a larger percentage of low priced car deliveries than the same month last year, the light cars being responsible to a large extent for the favorable comparison in totals of the two months, although the volume of business in dollars and cents will be lower. Medium priced and high priced lines have suffered in comparison with last year.

Used car deliveries have been proportionate to the run of new car business as a whole, but show a tendency to be slow.

Business through the State, which has been held back by weather conditions, is expected to develop rapidly with the approach of better weather.

(*Conditions in other cities on pages* 798 *and* 799)

OPERATIONS WAIT ON SPRING BUYING

Weather Is Element in April Schedules

Makers Who Have Been at Capacity Through Winter Will Reduce Their Programs

DETROIT, April 2—Without an early and pronounced break in weather conditions, April will be lucky to show itself as good a production month as March. The industry is entering April with production slowed down in many of the larger producing plants, and unless the break in the weather comes with a consequent hastening of the buying impulse it is practically certain that operations will be slow throughout the month.

This slowing of operations is confined, for the most part, to those plants that have operated on a policy of maximum production through the winter months, and consequently have a large bank of cars. Manufacturers who were on part schedule through the winter are now operating on capacity schedules, and are striving for increased production.

Should production for the month show a total as high or nearly as high as the earlier months it will be due in large part to the continuance of unrestricted operations by the Ford Motor Co., which has set a schedule on 200,000 cars for the month. This will represent an increase of 15,000 to 20,000 over March. Cars are moving at retail at slightly better than this rate, the factory declares, and some inroads are being made into Ford dealer stocks, but it will take a stretch of good warm weather to get buying moving at the rate that has been anticipated.

50,000 Planned by Chevrolet

Chevrolet Motor Co's schedule for the month will be about the same as March, which means a total of about 50,000. With good weather the April schedule would have mounted to 60,000 or 70,000, but because of the late season it is being held down. Chevrolet retail sales show an increase of 15 per cent over the first three months of last year, this being lower than the increased rate of production, but the cars ahead are necessary, the factory declares, to meet the anticipated spring buying rush.

Companies like Dodge Brothers, Studebaker, Hudson and Essex, whose manufacturing schedules were comparatively light in the winter months, are at capacity and are seeking higher totals. Stocks in dealers' hands necessarily are lower with these companies, and schedules are arranged to get cars ahead for the buying movement.

Even those companies, however, that are going into the month at capacity say a continuance of poor weather may cause a revision downward in their schedules the last part of the month, which will bring the total to a low point. The whole tendency in the industry, either in increasing schedules or letting down, is to protect the dealer stocks that have been built up in an effort to prevent losses to dealers through inability to make prompt deliveries as was the case last spring.

Those companies that are reducing or

(*Continued on page* 801)

Business in Brief

NEW YORK, March 31—Irregularity in industrial conditions prevails and the situation seems to be quieter, a condition that may be attributed to several causes, such as bad weather and roads, wet soil, price uncertainties, a late Easter and a slump in the stock market.

Caution on the part of the business world has been brought about apparently by the turmoil at Washington, involving tax revision, the approval of the bonus bill by the House, and the oil investigation. The sharp decline in the exchange value of the French franc, until it was slowed by the American loan, has been an additional disturbing element.

Within the week cotton and wheat have gone lower, the latter being 11 cents off from the date when the new tariff rate was approved. Crop reports indicated a spotted condition, with movement of grains falling off and less corn being offered because of the break in prices, poor country roads and light stocks in elevators. Oat deliveries, Chicago says, are the lightest in years.

Car loadings for the week ending March 15 were lower than the previous week, with 916,953 to 929,505, although slightly in excess of a year ago. Taking the first eleven weeks of the year, there has been a slight gain in the loadings of revenue freight, the gain being 3.2 per cent over the same period in 1923 and 18.5 per cent over 1922.

Bank clearings also are down somewhat, the report for the week ending March 27 showing an aggregate of $8,095,374,000, against $8,378,832,000 the preceding week and $7,273,038,000 in this week last year.

Stocks are lower, bonds firm, call money higher, with the franc continuing to climb.

Year's Parts Sales Show No Decline

Business Is as Good as First Quarter of 1923—Caution Regarded as Praiseworthy

NEW YORK, March 31—Going on record as believing that the general business of the country is being adversely affected by failure of Congress to pass constructive legislation, and declaring that clarifying of the situation at Washington undoubtedly will have a beneficial effect upon general business conditions, in spite of an impending presidential year, directors of the Motor and Accessory Manufacturers Association, at their monthly meeting last week, reported themselves well satisfied with present conditions in the automotive field.

Conditions Satisfactory

President G. Brewer Griffin, following the meeting, issued his customary statement as to conditions and outlook, in which he points out that car builders and parts makers are both enjoying business as good as last year, or better, for the like period, and that the caution now being displayed is praiseworthy rather than alarming.

After discussing general business conditions and declaring that "purchasing seems unduly sensitive to weather conditions," Mr. Griffin says:

There is some falling off in orders and commitments in the automotive accessory field, but so far this year the business as a whole is as good or better than last year for a like period. A let-up perhaps should not have been unexpected as a condition exists today where the rush of spring demand for motor vehicles has been largely anticipated and provided for by many of the larger producers. Stocks of vehicles of many makes are in hand to care for prompt deliveries to the user, avoiding the delayed conditions of other years.

Oppose Big Inventories

We believe a reasonable balance between optimism and conservatism should be maintained. Safeguards should be thrown about any tendency to accumulate a stock of materials or finished parts beyond reasonably firm orders. Inventories should be held down to a close working minimum, with the most rapid possible turnover from raw materials to shipment of finished goods, and a constant study of productive costs to the point of maximum efficiency.

The sale of vehicles will undoubtedly be large in the late spring months and probably within thirty days the duration of the present breathing spell can be measured more accurately.

It is the spirit of the industry to attempt each year to break the record of the previous year by a wide margin, and generally, such attempts have been successful. The industry has had its wagon hitched to a star; good judgment will not select a comet instead.

Final Touches Given to Tax Repeal Bill

Senate Finance Committee May Recommend Taxing Trucks and Bodies Separately

WASHINGTON, April 2—The fight of the automotive industry for partial repeal of the Federal excise taxes entered the home stretch this week and the outcome, at the hands of the Senate Finance Committee, will be known by Monday or Tuesday of next week.

A number of important developments have occurred in the consideration of the bill, since it was first taken up by the House Ways and Means Committee in November, 1923. Chronologically the measure was reported out of that committee on Feb. 11, and passed the House on Feb. 29, providing relief of approximately $25,000,000 for the automotive industry, by a repeal of half of the excise taxes on accessories and parts, resulting in a cut from 5 to 2½ per cent, amounting to $20,000,000 in round numbers and a reduction of the tax on trucks costing less than $1,000, which will mean another $5,000,000 to small truck users.

Bonus May Figure

The most important development is the coupling of the revenue act measure with the bonus. During the last three days of this week Secretary Mellon has been closeted with the Senate Finance Committee going over the revenue producing features of the measure. If the Senate passes the soldiers' bonus over the President's veto, it will mean the raising of $125,000,000 annually for bonus payments.

In the opinion of certain members of the Senate Finance Committee, including Senators Reed Smoot and David I. Walsh of Massachusetts, if the bonus bill is passed, it will have a bearing on the automobile section, reducing the amount of relief considerably below the $25,000,000 cut made in the House.

At the request of a representative of AUTOMOTIVE INDUSTRIES Senator Walsh, a member of the Senate Finance Committee, summed up the status of the revenue bill, and particularly the automotive section, today as follows:

We shall in all probabilities reach the automobile section on Saturday and will be able to report the bill to the Senate on Monday or Tuesday.

May Separate Taxes

The administrative features of the automobile excise section as contained in the House measure are cumbersome, insofar as they relate to chassis and to bodies sold separately. Confusion is sure to follow.

It would not be at all surprising if the Senate Finance Committee reported the measure out providing for an exemption of $1,000 on all trucks and $300 on bodies.

Should the Senate, however, pass the bonus bill (and it will be passed before the conferees can write the report on the tax measure), unquestionably the figures would have to be revised and it would, no doubt, affect the automobile section as other sections.

One thing is certain, the war is over, and the taxes—and by that I mean all taxes—on automobiles, trucks and parts, passed as a war expediency, should now be repealed.

A great deal of pressure has been brought to bear by several large truck makers in Ohio, Pennsylvania and Indiana who feel that they have been discriminated against by the fact that their product of heavy trucks will not share in the tax reduction program. Both Senators and Representatives from these States have received large numbers of telegrams urging that the truck exemption of $1,000 be made on all trucks, regardless of weight or price.

Certain members, however, including it, so happens, two in the Senate and three in the House who are members of the Senate-House Conferees Committee who will rewrite the measure in conference, are unalterably opposed to including the heavy trucks in the tax reduction program.

Senators Smoot and McLean (Conn.), and Representatives Green (chairman), Halley and Treadway, of the House Ways and Means Committee have stated their position, "that it is the heavy trucks that tear up the roadway."

Congressman Treadway (Mass.), in making an attack on the measure in the House, recited the fact, he told his colleagues, of seeing a heavily loaded truck last summer ruin several blocks of asphalt that, he declared, "would cost the city several hundred dollars to repair." Argument of the same tenor was advanced by others of the committee named above.

Congressman Robert H. Clancy of Michigan, who has championed the measure through the House and is closeted almost daily with members of the Senate in the upper body, declares that the opposition of the railroads to competitive trucks, all of them big trucks, was very pronounced and that Senators, and especially members of the committee, had been urged to oppose any relief for the big truck user.

Limiting the Number of Capacities for Motor Trucks Would Result in Economies to Producer

AN INTERVIEW WITH C. J. HELM,
General Manager of the Acme Motor Truck Co.
By D. M. McDonald,
Detroit News Representative of the Class Journal Company

Detroit, April 2.

STANDARDIZATION by truck manufacturers on a certain fixed group of capacities on which to base their models is regarded by C. J. Helm, general manager of the Acme Motor Truck Co., as one of the essential needs of the truck industry.

There is no sound economic reason for the multiplicity of models which are being offered today, said Mr. Helm, and a definite step toward confining these to a restricted number of load capacities would be a boon to this branch of the industry.

By fixing a given number of capacities, not more than four or five, for which trucks are to be designed and built, all of the present diversified effort could be concentrated with resultant economies and advantages not only to parts and truck manufacturers, but to dealers and users.

Mr. Helm sees a real need for standardization of this kind, and his position as general manager of one of the well-established truck companies doing business on a national scale, lends weight to his opinion. Parts makers and manufacturers should find no difficulty in agreeing upon the capacities which would meet all needs, he declares.

In voicing his suggestion for fewer truck models he does this solely with the freight carrying vehicle in mind and does not include the bus or passenger carrying vehicle. Chassis for buses cannot be considered in a plan for standardizing freight chassis, he agrees and he advances the thought only as a means of reducing some of the complexities confronting the truck maker.

Mr. Helm looks for 1924 to show an increased demand for the larger truck chassis, following several years in which the light truck has completely dominated the market. He bases this view upon the belief that the requirements of business will be more extensive this year than for several years, and that the economy of the heavier truck for the heavier work to be done will result in its increased use.

Truck users as a rule have had enough experience to know that over-loading of light trucks is not good business, said Mr. Helm. The rapid deterioration under such service more than overcomes any initial saving and it is a certainty that with increased opportunity for business, operators will turn to the heavier vehicles.

The great preponderance in sales of light vehicles in the last few years is ascribed by Mr. Helm to hesitancy on the part of users to place too much money in truck equipment without certainty of good business. The tendency in the truck business has always been to take a chance on the necessity to have to overload than to underload, and this has reacted to the advantage of the light vehicle.

Net Profits Doubled by Spicer Last Year

Reached $1,075,673, Which Is Equivalent to $2.66 a Share on Common Stock

NEW YORK, March 31—The Spicer Manufacturing Corp. cleared a net profit of $1,075,673 in 1923, after interest, depreciation and taxes, as compared with $512,744 in 1922. This showing is equivalent to $2.66 a share earned on the outstanding 313,750 shares of no par common, after payment of preferred dividends, against 86 cents a share the preceding year.

Net sales totaled $12,600,158, against $9,680,190.

The balance sheet shows net assets of $15,947,157, which includes: Lands, buildings, machinery and equipment, less depreciation, $3,667,408; good will, patents, etc., $4,541,865; investment in Salisbury Axle Co., $1,608,859; other investments, $675,700; inventories, $3,376,814; accounts and notes receivable, $1,100,537; miscellaneous investments, $86,865; cash, $764,800; deferred charges, $124,309.

Liabilities reported are: Preferred stock, $3,000,000; common stock (313,750 shares no par value), $7,375,000; funded debt, $1,450,600; notes payable, $1,317,000; accounts, payrolls, etc., payable, $609,999; reserve for Federal taxes, $374,317; surplus, $1,820,241.

Commenting on the statement, President C. A. Dana says:

The 6 per cent serial gold notes are now outstanding only to the extent of $600,000, having been reduced to this amount from the original issue of $3,000,000. Dividends on 8 per cent preferred stock were paid as usual during the year. The business of the company as a whole showed a considerable increase in volume. Universal joints were in much greater demand, due to the increased production of automobiles of less than $1000 in value.

The truck business showed a steady improvement and there is every evidence that such improvement will continue during the year 1924, due to the probable demand from the Government for the Post Office and other departments.

Although the 1923 axle business was not in sufficient volume to permit that department to operate at a profit, the recent increase in sales warrants the belief that the axle business will soon be on a profitable basis.

Superior Steel Products Formed in Pennsylvania

MONACA, PA., March 31—M. P. Simpson, William Elmes and F. H. Guppy, until recently connected with the Moltrup Steel Products Co. and formerly with the Standard Gauge Steel Co., both of Beaver Falls, Pa., have organized the Superior Steel Products Co., which will be located here.

The new company has purchased a site about 800 feet in length, adjoining the New York Central lines, and the first unit of the plant will be a building 300 x 60. The company will manufacture cold finished steel in standard and special shapes, screw steel, shafting and polished rods; round, hexagon, flat and square cold drawn steel bars, finished steel plates and other steel products.

The company will be capitalized at $100,000, and the officers will be: M. P. Simpson, president; William Elmes, vice-president; Homer H. Swaney, treasurer, and F. H. Guppy, secretary.

Plan of Marlin-Rockwell to Buy Gurney Approved

NEW YORK, March 31—Stockholders of the Marlin-Rockwell Corp. have ratified the plan for the acquisition of the Gurney Ball Bearing Co. for $2,722,800 of 7 per cent preferred stock and 133,685 shares of no par value common. The stockholders also have authorized an increase in the capital to provide stock to be given in exchange for the Gurney company.

This is the deal announced in the March 13 issue of AUTOMOTIVE INDUSTRIES. Now that it has been approved, it is stated that the joint companies will be controlled by the Gurney interests, headed by H. K. Smith, operating the Marlin-Rockwell plant at Plainville, Conn., and the Gurney establishment at Jamestown, N. Y. Through the consolidation the bank debt of the Marlin-Rockwell Corp. will be entirely wiped out.

Head of Transport Truck Will Continue Operations

MOUNT PLEASANT, MICH., March 31—The Transport Truck Co., which recently went into a receivership, will continue operations under the direction of President M. A. Holmes, who has been placed in full charge of the company's affairs by Receiver Roland A. Crandall of Chicago.

It is claimed that, while the company suffered some severe losses during the past two years, the amount of its assets is several times that of its liabilities, and that the operation of the factory under a receivership will enable it to make payment in full of all indebtedness, which is approximately $266,000, and perfect a reorganization. Shipments of trucks and parts are being made.

Duplex Producing Line in New Lansing Plant

DETROIT, April 2—Duplex Truck Co. is now in production on a full line of models in its new plant in Lansing. The company reports present business larger than early year business for the past several years. There are enough orders on hand, the company reports, to maintain operations in full for some time and it has added a number of men to speed up things.

Reo Motor Car Co. is using the plant bought from Duplex as its bus plant and has already transferred practically all of its bus work.

Kleiber Will Enter Car Producing Field

Trucks Will Continue to Be Made —Mail-Order House to Build Tire Plant on Coast

SAN FRANCISCO, April 1—Four important developments in the automotive industry for San Francisco have been announced by the industrial department of the San Francisco Chamber of Commerce.

First came the statement from Theodore F. Merseles, president of Montgomery Ward & Co. of Chicago, that an automobile tire factory, with an annual output of a value of $1,000,000, will be erected by the mail-order firm immediately, either in San Francisco or Oakland. The company has completed a large concrete and steel building as Pacific Coast headquarters in Oakland, and it is considered probable that the tire factory will be built there also.

Output to Be Sold in West

The entire output of this factory is to be sold in California, Oregon, Washington, Nevada and Arizona, according to Mr. Merseles.

The second automotive announcement from the chamber of commerce is to the effect that Paul Kleiber, president of the Kleiber Motor Truck Co., will devote his attention hereafter to the manufacture of passenger cars, though at the same time continuing the production of trucks. The new touring-car factory, for which the land has been obtained at Folsom and Tenth Streets, San Francisco, is to be built at once. It is to be 275 x 125 ft., of brick, steel and glass, with equipment for the production of 3000 cars yearly and employment of 500 men.

The Fischer-Gaffney Body Co. is the third on the list, with plans being prepared for a new $75,000 building at Tenth and Howard Streets, one block from the Kleiber factory. The Fischer-Gaffney people are now doing a business of $400,000 a year in the building of bodies for motor stages and trucks, taxing to capacity its present plant. The building of bodies for the Kleiber cars will be done largely in the new building.

Fischer-Gaffney Expanding

Doubling of its present number of employees and the installation of metal stamping and forming machines to do work now sent out on contract is announced by the Fischer-Gaffney company, distribution of whose products extends as far east as Kansas City, north to the Canadian border and south to the Mexican line.

The fourth development in the industry here is the removal of the Gruss Air Spring Co., Inc., to a new specially constructed, reinforced concrete building on the west side of Ninth Street, between Howard and Folsom. The Gruss company will be in the new plant by May 15.

Congress May Alter Merchant Marine Act

Bill Now Pending Would Aid Industry—Delegation Meets with Shipping Board

WASHINGTON, March 29 — Lower freight rates for American made goods exported in American ships, as provided for in the Merchant Marine Act of 1920 and effective on May 20 of this year, will not benefit the automobile exporting industry, but on the contrary the enforcement of the act, it is believed, will curtail the speedy shipment of automobiles intended for export. This view was expressed this week in a series of conferences between representatives of the automobile industry and officials of the United States Shipping Board and the Emergency Fleet Corp.

Other Industries Share Fears

The automobile manufacturer's apprehension as to the merit of the act is shared by many exporters in other industries which, like the automotive industry, have sent delegates to Washington to secure more data on its provisions. The merit to many of these protests has been recognized to the extent that Congressman Newton of Minnesota has introduced a bill (H. R. 8081) which would amend the Merchant Marine Act so as to give discretionary powers to the Interstate Commerce Commission to except certain commodities such as the automobile from the provisions where enforcement would work a hardship rather than be helpful.

The act, as passed, was intended by Congress to encourage the use of American ships in export trade by offering as an inducement a rate which would be less than the domestic freight rate from a manufacturer's plant to the seaboard, provided that the manufacturer used an American ship in moving his goods.

Because of the fact that the automobile industry already has obtained an export freight rate from factories to seaboards, which is less than the domestic rate, the enforcement of the act would mean that in order to keep the rate they already enjoy, all automobiles intended for export would have to move in American ships.

Choice of Vessels Now Optional

Without the Merchant Marine Act, at the present time, automobile exporters already get the same rate and are at liberty to use either American or foreign vessels, whichever may happen to have the quickest sailing date and the shortest sailing time between ports.

Under the provision of the act, the exporter would have to wait until he could obtain space on an American vessel, or else he could use a foreign ship, but must pay the domestic freight rail rates, which in the majority of cases is approximately 33⅓ per cent higher than the present automotive-seaboard export rate.

There is no disposition on the part of the automobile industry to use foreign vessels in preference to American ships, J. S. Marvin, manager of the traffic department of the National Automobile Chamber of Commerce, acting as spokesman, pointed out to the Shipping Board.

The main purpose of the representatives of the automobile industry meeting with the Board at this time, Mr. Marvin declared, was not to protest against the provisions of Section 28 of the Act, but rather to secure all data possible as to the facilities the Board would have in the rapid transit of automobile export shipments.

The need of ships to move America's annual automobile exports was stressed by Mr. Marvin, who pointed out that during 1923 the total tonnage of automotive exports amounted to more than 1,500,000 tons and that the shipments went to 114 different countries. Many of the foreign shipments went to countries not touched by American vessels, and on these shipments the automobile exporter must, of necessity, employ foreign vessels, and under the provisions of the act this would necessitate the payment of a higher rail rate to many ports, not excepted under the provisions of the act.

The act includes ports between the United States and ports of Great Britain and North Ireland and the Irish Free State, the ports of Continental Europe north of and including Bordeaux and the East Coast of Asia, the islands of the Pacific Ocean, Australia and the East

(*Continued on page* 797)

U. S. Sees High Pressure Tires in Biggest Demand

NEW YORK, April 1—It is safe for the tire dealer to expect that 85 per cent of the tires sold during 1924 will be of the high-pressure variety and that the balloon tire will not make substantial inroads on the use of high-pressure tires this year, declares the United States Rubber Co. in an announcement made today.

In this connection it is pointed out that it took about seven years for the cord to drive the straight-side fabric off the market, although the merits of the cord were apparent from the first.

Nevertheless, tire manufacturers regard the balloon as the tire of the future and a development which cannot be sidetracked. They realize, however, that the public will regard balloons as something of an experiment and will hesitate about paying more for them than is asked for standard high-pressure tires which have proved eminently satisfactory.

GEAR ASSOCIATION MEETING

NEW YORK, April 1—The eighth annual meeting of the American Gear Manufacturers Association will be held April 28 to 30 at the Lafayette Hotel, Buffalo. Among the speakers will be J. C. McQuiston, manager of the publicity department of the Westinghouse Electric & Manufacturing Co., who will talk on "Advertising as an Investment to the Gear Manufacturers."

Fords Not Stocked for German Market

Company Scouts Report That Accumulation of Cars Waits Lifting of Embargo

DETROIT, April 1—Cabled reports that a quantity of low priced American cars, inferentially Fords, are awaiting the lifting of embargoes to be placed on the German market are ridiculed by the Ford Motor Co. offices here. The company has no cars in storage anywhere, least of all in Europe, and it declares that it seems impossible that any American company should have cars stored awaiting opening of the German market as this may not be for many months, and money invested in either assembled cars or parts would thus be tied up for that time.

No Assembling in Germany

Reference is made in the reports to unassembled cars, which would automatically eliminate the Ford company, officials say, as it has no arrangement for assembly of cars in Germany, nor has any other American manufacturer that it knows of.

When the German treaty is made, the company says, it is prepared to ship cars into Germany, but these will be assembled cars from either the Antwerp or Copenhagen plants, both of which are situated close to the German border. Cars from either of these plants may be shipped or driven in.

The company is doing a considerable business in the German occupied zone, in which it has established a number of dealers.

There are no dealers in the unoccupied territory, but the company has had representatives in that country for a considerable period, making arrangements for the opening of that territory when the treaty is signed. Reports from these representatives are that German car manufacturers look with favor upon the advent of American low priced cars as a means to opening up the country and encouraging demand for cars generally.

Dealers Decide Selling Plan

That cars are to be sold upon the installment plan is a question of financial arrangement within the country by dealers. The factory declares Ford cars are being sold in many countries under an installment plan similar to that in the United States, but that is through arrangements made by dealers and banking interests.

The company itself has no part in the financing of such sales, it emphasizes, nor does it sell to dealers anywhere on an installment plan. Undoubtedly cars will be sold on a part payment plan in Germany when the market is open, the company declares, but that will be purely a matter of arrangement within the country.

Profit of $2,715,226 Reported by Durant

Earnings Were Reduced Because of Midseason Change Made in Company's Policy

NEW YORK, April 2—Manufacturing activities of Durant Motors, Inc., and its various subsidiaries in 1923 produced a net profit of $2,715,226, according to the annual report of the corporation made by President W. C. Durant. This is equivalent to $2.26 a share on the 1,200,216 shares of no par value capital stock outstanding.

The balance sheet as of Dec. 31 shows assets and liabilities of $73,871,955. The bulk of the assets is found in "investments in and advances to allied companies," which represent $41,378,676; and in "participating contracts," $23,488,000. Cash on hand and in banks is reported at $1,044,627.

Has Sold 235,004 Cars

Accompanying the statement is a report over the signature of President Durant, who says:

As of this date your company has been in operation exactly two years and four months. During that time it has acquired and now controls a group of well equipped plants having a floor area of 8,002,090 square feet (184 acres) with a capacity in excess of 600,000 motor cars per year.

It has manufactured and sold 235,004 motor cars. It has established 3100 selling agencies. It has on its payroll in excess of 50,000 employees, operating exclusively on Durant products. Its accessory plants are in strong financial position. All construction work in accordance with original program has been completed and paid for. The company has no bank indebtedness.

The net profits for the year, after proper depreciation charges of every description and after providing for Federal and State taxes, amounted to $2,715,226.

Earnings were materially reduced because of an unforeseen condition in the industry which, in the opinion of your management, justified a midseason change in policy. An unprejudiced review of the situation indicated that the motor industry was not on a sound basis. In the wild scramble for record production, prices were slashed, reckless methods of merchandising were adopted, profits were sacrificed and fictitiously low standards of value were established.

Feared General Demoralization

In the opinion of your management, unless a change took place, there could be but one outcome, viz., the demoralization of the greatest industry in this country, carrying with it—because of the varied interests involved—widespread confusion and disaster.

That the interest of our stockholders might be properly safeguarded the policy of the company was changed to meet a possible situation, and while the change entailed a considerable expense and resulted in the loss of some business during the late summer and fall months, your company is now in stronger position than ever before and prepared to safely and satisfactorily meet any reasonable situation. The wisdom of our policy is evidenced by a survey of the industry at this time.

The corporation's balance sheet as of Dec. 3, 1923, follows:

ASSETS

Real estate, plant and equipment, less depreciation		$80,821
Investments in and advances to allied companies		41,378,676
Listed securities at cost		3,423,059
Cash on hand and in banks		1,044,627
Notes receivable (secured)		4,808,914
Accounts receivable		534,882
Materials and supplies		475,234
Deferred charges		856,775
Participating contracts	$23,488,000	
Less current year's proportion of earnings of divisional companies	2,219,039	21,268,961
Total		$73,871,955

LIABILITIES

Accounts payable—current	$1,238,448
Advances by Star Motors, Inc., against manufacturing operations	9,603,251
Taxes, payrolls and sundries—not due	311,695
Capital stock (1,200,216 shares)	21,069,381
Surplus	41,649,178
Total	$73,871,955

INCOME AND SURPLUS ACCOUNT

Proportion of earnings from divisional companies, dividends and miscellaneous income	$4,405,364
Less administration and engineering expense	1,690,138
Net income after provision for Federal taxes	$2,715,226

SURPLUS ACCOUNT

Surplus first of year	$41,245,415
Less 1923 adjustment	92,425
Net	$41,152,990
Net income as per income account	2,715,226
Total	$43,868,216
Less proportionate earnings of divisional companies credited to participating contracts	2,219,038
Surplus as per balance sheet	$41,649,178

Net Profit of Franklin Reported to Be $759,342

SYRACUSE, April 2—The H. H. Franklin Manufacturing Co. made a gross profit of $1,174,539 in 1923, according to the report sent to stockholders. After deductions, the net profit is placed at $759,342, equivalent to $2.36 a share on the 300,223 shares of no par common stock outstanding. The plant inventory is placed at $6,694,670.

H. H. Franklin, president of the company, in a statement declares that the high production schedules mapped out by car manufacturers this year would have meant overproduction. There is no reason for any panicky feeling, he says. He points out that the season is late, and predicts that with the coming of warmer weather a satisfactory volume of spring business is in prospect.

The Franklin company is producing 44 cars daily.

Jordan Motor Shown in Strong Position

Its Assets Placed at $3,373,703—Its Indebtedness Reaches Only $271,674

CLEVELAND, April 1—From the pen of E. S. Jordan, president of the Jordan Motor Car Co., comes what he calls "the A, B, C of Jordan's Financial Position," a digest of which shows that on the day it was written the company had assets valued at $3,373,703 and owed but $271,674.

After telling of the formation of the company eight years ago, on an investment of $300,000, since which time each of the original investors, if he retained his holdings, has received an 80 per cent return in cash dividends, while his stock has increased 334 per cent in value, Mr. Jordan states:

Just the other day the Jordan company had $1,056,087.80 cash in the bank. On that day the Jordan company owed to people who sell us our materials, just $271,674.97. On the same day the dealers who buy Jordan cars owed the company $446,956.74 for cars which were on the road from the factory to the dealers' places of business. On the same day the company had $1,023,749.27 worth of material being used in daily production of Jordan cars, and these materials were all paid for, with the exception of $271,674.97, the figure above mentioned.

On that day the land, buildings, machinery and equipment of the Jordan company appeared on the statement at a valuation of $846,909.50, all paid for. That figure represents the original cost of the buildings and the machinery with deductions covering depreciation. This in spite of the fact that the land upon which the Jordan plant was built was purchased at $5,000 an acre and has been appraised at $35,000 an acre.

Take your pencil and paper and add up the assets covered by the preceding figures and you get a total for that day of $3,373,703.31. On the same day the Jordan company owed just $271,674.97.

The Jordan company does not owe a dollar to any bank, has no bonded indebtedness, no mortgages and no bank obligations aside from the current bills due to purveyors who are shipping us materials day by day.

SANDOW BUYS KALAMAZOO

CHICAGO, March 31—The Sandow Motor Truck Co. of Chicago Heights has purchased from Receiver John L. Carey the assets and good will of the Kalamazoo Motors Co. of Kalamazoo, Mich. The entire stock will be moved to Chicago Heights, where the Sandow company will continue to service all Kalamazoo trucks.

PRESTON TO BE SOLD APRIL 8

BIRMINGHAM, ALA., April 1—The Preston Motors Corp., which was adjudicated bankrupt on March 10, will be sold to the highest bidder at noon on April 8 at Plant Number 1.

R. H. Collins Becomes Chicago Distributor

Takes Over Rights to Maxwell and Chrysler Cars in That Territory April 1

DETROIT, April 2—R. H. Collins, widely known in the industry as president of the Cadillac Motor Car Co. and more recently as head of the Peerless Motor Car Co., will take over the distributing rights in the Chicago territory for Maxwell and Chrysler cars. Beginning April 1, Mr. Collins takes over the Maxwell-Chalmers Sales Co., which up to this time has operated as a factory branch, and will continue operations in the same location on Michigan Avenue.

Announcement of Mr. Collins' connection comes from Joseph E. Fields, general sales manager of the Maxwell-Chalmers and Chrysler companies. Reports that this important addition to the distributing forces of the three companies would be made have been current for some time, but pending completion of the terms of the transaction no formal statement has been made by the company up to now.

By becoming the distributor for these cars in Chicago, Mr. Collins takes over an organization of twenty-two dealers in the city itself, with approximately twice that number in the greater Chicago territory. In disposing of the Chicago branch, the company now is entirely divorced from direct factory operations in the retail field, the New York branch having been sold about two years ago.

The entrance of Mr. Collins into the distributing field is really a re-entry, as his introduction to the industry was as manager of the Buick Kansas City branch. From that work he went to the Buick factory as sales manager, where he was first associated with W. P. Chrysler, then a manufacturing executive.

90 Days Recommended as Balloon Guarantee

NEW YORK, March 31—Formal announcement is made by the Rubber Association of America of the action taken at the meeting of the Executive Committee of the Tire Manufacturers Division, which recommended the revision of the Standard Tire Warranty, so that all pneumatic tires, which would include balloons, of course, be warranted free from defects in material and workmanship developing within ninety days from date of first road wear, as published in Automotive Industries of March 27.

In its statement to members, the Rubber Association says:

> The revised warranty requires that claims for tires alleged to be defective must be filed by the original user of the tire within the ninety day period, or within five days thereafter.
>
> The Executive Committee also recommends that the revised warranty be made effective May 1, 1924.

No change was made in the present warranty covering solid or cushion tires.

At the same meeting a discussion of the desirability of adopting a schedule of load carrying capacities and inflation pressures for balloon tires indicated that because of differences of opinion respecting manufacturing practices, variation in car weights, proper wheel loads and desirable corresponding inflation pressures, it would be impracticable for the Tire Executive Committee to recommend a standard schedule for use by tire manufacturers.

The committee concluded to recommend to members of the Tire Manufacturers' Division that inflation pressures for balloon tires be measured on the basis of a tire deflection of approximately 22 per cent, which is believed to be the most accurate method of insuring proper inflation.

Nash Motors Announces Changes in Price List

KENOSHA, WIS., March 31—Effective April 5, the list price of three of the thirteen models in the Nash line will be increased $35 each. The price advance affects only these three models, as follows:

	Old Price	New Price
5-Pass. Six-Cylinder Phaeton	$1240	$1275
7-Pass. Six-Cylinder Phaeton	1390	1425
Six-Cyinder Roadster	1240	1275

All But One Hudson Car Increased $75 in Price

DETROIT, April 2—The Hudson Motor Car Co. has announced an increase of $75 in the price of all its models, with the exception of the new seven-passenger sedan recently announced at $2,145, which remains unchanged.

The advanced prices are effective immediately. The list follows:

	Old Price	New Price
4-passenger Speedster	$1,350	$1,425
7-passenger Phaeton	1,425	1,500
5-passenger Coach	1,475	1,550
7-passenger Sedan	2,145	2,145

Rockwell Named Sales Director for Parsons

DETROIT, March 31—W. D. Rockwell, one of the well-known sales figures in the industry, has been appointed director of sales of Parsons Manufacturing Co., in which capacity he will proceed at once to the development of a national sales organization to merchandise the Parsons line of body equipment direct to the replacement trade. This will be in addition to its regular equipment business with automobile and body manufacturers.

The Parsons company is introducing a new radiator shield, a metal dash-controlled winter front, and also a new window-lift, the invention of Carl B. Parsons, president of the company. The latter is described as simple in its operation and installation.

Mr. Rockwell for three years served as director of sales at the A. C. Spark Plug Co. and was also director of sales of the Universal Machine Co., Bowling Green, Ohio, and for the Adams Axle Co., Findlay, Ohio.

Wheel Patent Right Upheld in Chicago

Claim of Packard and Wire Wheel Corp. to Cowles Invention Is Sustained

CHICAGO, April 3—Holding that the Overland Motor Co. of Chicago has been guilty of infringement upon the patent rights of the plaintiffs and enjoining such infringement in the future, Judge Adam C. Cliffe of the United States District Court here has rendered an opinion in which he confirmed the patent rights to the Cowles wire wheel invention, which has been claimed by the Packard Motor Car Co. and the Wire Wheel Corp. of America.

Patent Sold to Packard

The patent in question was acquired by the Packard company from Edward P. Cowles, inventor, the Packard company thereafter selling exclusive manufacturing and merchandising rights, except as to itself, to the Wire Wheel Corp.

It was contended by the Overland company that the subdivision of the inventor's original rights constituted abandonment of his claims and, therefore, put the invention beyond recapture. It further contended that, in view of prior art, the claims at issue were not for a patentable invention. On both points the court overruled the defendants.

The opinion states that the defendant failed to prove the unpatentability of the article in view of prior art, it being held by Judge Cliffe that the device in question is, in fact, a new and useful invention subject to patentability and that the plaintiffs are entitled to all the usual legal protection of bona fide patentees.

The object of the invention, as set forth in the record, is to provide for a front and rear hub so constructed as to permit a convenient and quick interchange of wheels, or the substitution of a spare wheel for a disabled wheel without taking down the bearings, by making all the wheel hubs substantially similar and by providing hub receiving members for the front steering spindle and the rear driving axle, respectively, with parts of similar exterior form, so that the wheels may be interchangeable on the front steering spindle and the rear driving axle.

Regarded as Test Case

This is regarded as a test suit of possible far-reaching importance, and it is declared that the case will be appealed to the Seventh Circuit Court of Appeals at Chicago. It also is said that the decision applies only to wire wheels and does not include demountable disk wheels. It is possible it is said, that the matter of disks will come up in another suit, following the final decision in the wire wheel case.

California May Levy 5 Cent Gasoline Tax

Chairman of State Highway Commission Also Suggests $10 Fee for Registration

LOS ANGELES, April 2—The announcement by Harvey M. Toy, chairman of the State Highway Commission, of proposed increases in motor vehicle taxation in this State has had a stunning effect on owners and dealers. Mr. Toy recommends a gasoline tax of 5 cents a gallon, a 100 per cent increase in the weight fees on commercial vehicles and a registration fee of $10 on every vehicle. The present registration fee is $3 and the gas tax is 2 cents a gallon.

Opponents of the gasoline tax, when the proposition was before the Legislature one year ago, predicted that a 2 cents tax would be but a start and all of them are now saying, "I told you so."

Toy's recommendations are so startling that the motoring public is amazed. The automobile clubs of the State were the chief advocates of the gasoline tax and it is reported they will support the proposed increase. There are more than 1,000,000 motor vehicles registered in California and every dollar the registration fee is increased means $1,000,000 in revenue from this source.

The basis of the heavy increases proposed is the need for extending the highway system and the contention that the public will not submit to additional bond issues for road construction purposes. This means that under the new plan motorists not only would pay for the maintenance of the highways but the cost of original construction as well.

This principle is directly contrary to those advocated in this State in the past, to the effect that new road building is a capital investment and the cost should be borne by the public at large and abutting property owners.

A committee appointed under an Act of the Legislature is now making a survey of all the State highways, for the purpose of preparing and submitting to the next session of the Legislature a report on the situation.

Czechoslovak to Make Small Low Priced Car

WASHINGTON, April 1—Proposal of the Czechoslovak Government to manufacture small, light automobiles at one-half the cost of the lowest-priced car built in the United States is creating much interest and considerable adverse comment, according to cable advices received here this week at the U. S. Department of Commerce from Consul C. S. Winans at Prague.

The advices state:

The State war material factory at Brno, Moravia, has lately experimented with two of the new automobiles and it is stated that 500 of these cars will be put on the market during the spring of 1924. It is stated that the price of these government built cars will be 18,000 crowns against 36,000 crowns which is the current local price of the cheapest car built in the United States.

The distance between the front and rear axles will be 210 centimeters and distance between wheels, 100 centimeters; the weight of the complete car will be approximately 450 kilograms. The car is provided throughout with ball-bearings and is driven by a four-cylinder, two-phase, 12 hp. motor. Adverse comment in the newspapers is based chiefly on the very low price and the lack of a market for such a small light car.

Smaller Tire Builders Report on Operations

AKRON, April 1.—Information regarding present and future operations was given out by several of the smaller tire companies during the week.

The Trump Rubber Co. reports that its production has reached 100 tires a day and will be held at this point for some time to come. The Northern Rubber Co. reports that it is making some balloon tires for a new company just being organized. Its own production is about fifty tires a day.

Studebaker-Wulf Rubber Co., which recently purchased the former Excel Rubber Co. plant at Wadsworth, has started production of tires there and expects to employ 250 men before the end of the spring or summer.

Production has not changed recently at the plant of the Marathon Rubber Co., now operating under a receiver.

Tractor Trials Dated for Britain This Fall

LONDON, March 25 (*by mail*)—The tentative announcement made some weeks ago that it was hoped to organize farm tractor trials this year near London, after a lapse of three years, is now confirmed. The trials will cover four days, from Sept. 9-12, and will be held near Hounslow, which is within ten miles of the center of London.

The convenient location, it is hoped, will attract to the trials visitors interested in farming who will be in England from overseas to attend the British Empire Exhibition.

The prospects of British farmers becoming enthusiastic because of the trials to the point of placing orders are not bright, for the home agricultural industry is at a lower ebb than it has been for many years, and a great many farmers are converting into pasture a considerable proportion of their arable land.

CYCLEMOTOR CORP. ABSORBED

ALBANY, N. Y., March 31—The Cyclemotor Corp. of Rochester, N. Y., manufacturer of the Evans power cycle, has been merged with G. R. S. Products, Inc., of this city. The Cyclemotor plant will be moved to Albany and manufacture will be carried on in connection with the G. R. S. washing machine, electric dish washer and other products.

Ford Preparing Way for Greater Output

New Plants or Additions Will Permit Increase of 600,000 Cars and Trucks

DETROIT, April 2—New assembly plants of the Ford Motor Co. now under construction, and one, the Chicago plant, recently finished, will increase domestic production capacity 600,000 cars and trucks annually. The list of cities in which new plants or additions will be located are St. Paul, Memphis, Charlotte, Jacksonville, Kansas City and Oklahoma City.

In St. Paul the large hydro-electric plant at the head of the navigation on the Mississippi will have a capacity of 750 a day, an increase of 150 per cent over the capacity of the present plant there. The new Chicago plant, with a capacity for 600 a day, is now in operation, an increase of 140 per cent over the capacity of the former plant.

New Assembly Operations

The Charlotte and Jacksonville plants will represent the start of assembly operations in those cities, service plants being formerly located there for the convenience of dealers in the territory. Charlotte will have capacity for 300 daily and Jacksonville 150. The new Memphis plant, with capacity for 300 daily, represents a 200 per cent increase. Additions at Kansas City will double the former 250 daily capacity there, and at Oklahoma City the new capacity of 200 daily will present an increase of 33 per cent.

Plants started since the first of the year are those at Charlotte, Jacksonville and Memphis. It is expected they will be completed by early summer. These three projects represent an expenditure of several million dollars, declares the company, and while contributing to the industrial development of the South, also are indicative of the prosperous conditions existing in that section of the country.

Plants Are of Same Design

The three plants are of the same general design and incorporate latest achievements in factory engineering and production planning. Charlotte will have a floor area of 240,800 ft. and will employ about 1200 men. The Memphis plant is the same size as Charlotte. Jacksonville will have a floor area of 115,000 ft. and will employ about 600 men. Each plant will have an individual power house with steam turbines and generators furnishing power and light.

Direct railroad connections are made with each plant, and those at Jacksonville and Memphis have the advantage of water-frontage. J. cksonville has 1400 ft. on the St. John's River and Memphis 900 ft. on the Mississippi.

War Contract Claim Awarded to Packard

United States Court Orders Government to Make Final Payment of $425,540

WASHINGTON, March 31—The suit of the Packard Motor Car Co. and subsidiaries against the United States Government growing out of the purchase, under forty contracts, of approximately $15,000,000 worth of equipment during the war, has been wound up before the United States Court of Claims.

Under the award the final payment of $425,540 is to be made to the Packard company, and at the same time a counterclaim of the Government for $453,520 is disallowed.

The Government purchased 4800 chassis from the Packard company under a basic contract, entered into on July 27, 1917. Under its terms a clause was inserted to the effect that, should the Government, as a war revenue measure, at any time during the life of the contract, levy a sales tax, it should add it to the contract price.

Less than three months later, on Oct. 3, 1917, Congress passed the excise tax of 3 per cent on motor trucks, and under the terms of the contract, the Packard Motor Co. collected a sum amounting to $453,520 from the Government, in its payments of $15,117,365 for the purchase of the equipment.

Counterclaim Upset

This sum, the Government held, in its counterclaim against Packard, was wrongfully collected, but the court upheld the automobile manufacturer, declaring that it was the purpose of the purchaser and seller under the terms of the contract for the purchaser to add any excise or sales tax that Congress might assess, and that the Government must stand by the contract and pay the tax.

In its suit the company set forth that it had been paid for the 4800 chassis, with the exception of the sum sued for of $425,540, which the Government withheld, as a guarantee of the payment of the Government's counterclaim.

A sum of $3,656, embraced in the suit of the company, was disallowed, the court finding that this sum was included in the Packard's suit, but that the amount, if due, was payable to the Packard Motor Car Co. of Baltimore, Md., the Packard Motor Car Co. of New York, the Packard Motor Car Co. of Chicago and the Packard Motor Car Co. of Philadelphia. All of these named companies, the court found, were subsidiary companies of the Michigan corporation, and their claims could not be properly included in the parent corporation's suit.

DODGE BROTHERS DELIVERIES

DETROIT, March 29—Dodge Brothers report deliveries at retail by dealers in December, January and February as 32 per cent in excess of any similar quarter in the history of the business. Retail deliveries in the first two weeks of March were in excess of 8000.

Factory production in December, January and February totaled 54,521, or 25 per cent greater than the same months last year. Retail delivery records as reported showed gains each week. The first six months of the year will set a new delivery record, the factory expects.

Paige Starts Shipments of New Brougham Model

DETROIT, April 2—The Paige-Detroit Motor Car Co. has started shipments to dealers of a new Paige model known as the Four Door Brougham. It is of four or five passenger capacity, is mounted on the regular Paige chassis, and lists at $2,150.

The brougham is furnished in the standard type only. Cord tires, 33 by 4½, are standard, with wood wheels, but balloon tires, type 7.30, with disk wheels of the demountable rim type, may be obtained at $110 extra. This price includes four tires and five rims.

Maroon finish is used on the new model, and upholstery is in all wool mohair. The roof is of the soft construction, and the back and rear quarters are finished in leather. An extra large rear window is a feature. Equipment includes car heater, snubbers both front and rear, hand windshield wiper, cowl ventilator, gasoline gage, electric clock on dash, and a large rear trunk with dust cover.

This list is in addition to the usual closed car fittings, such as dome light, sun visor, foot and robe rails, and right front door lock, with inside bolts on the other three doors.

Mason Tire Production Placed at 4500 Daily

AKRON, April 1—Mason Tire & Rubber Co. reports that production of tires in its Kent and Bedford plants combined has reached approximately 4500 a day, which is about 75 per cent of capacity. The company is advertising for men for both plants in order to increase production.

The company's Bedford plant, the former Owen Tire & Rubber Co., was idle during a large portion of last year, but was placed into production early this year. This plant is producing about 1500 of the total production of the company.

Mason also reports that its southern cotton and fabric mills are operating at capacity with one shift a day, but that this production will be augmented with a night shift in the very near future.

NEW ENGINE PLANT FOR VELIE

MOLINE, ILL., April 2—The Velie Motors Corp. has put into operation its new engine plant at Marion, Ind., which has a floor space of 250,000 sq. ft. All the assembly work is done at Marion, the engines being shipped to the main factory here for installation in the cars.

Crude Rubber Prices Reported at Low Ebb

London Says That Combination of American Consumers Is to Be Blamed for It

NEW YORK, April 1—Crude rubber prices are at low ebb now, according to a copyrighted cablegram from London to the *New York Times*, because of alleged combinations of American consumers which have been formed for the purpose of cooperative buying, and because of the recommendation made to Congress by Secretary of Commerce Hoover that the Webb-Pomerene act be extended to permit consumers to set up common purchasing agencies for imported raw materials.

It also is asserted that the growers are considering the adoption of cooperative selling by plantation companies.

Denial is made, however, by prominent consumers on this side of the Atlantic that cooperative buying has been resorted to as yet, although it is said that this probably will come about if Congress approved Secretary Hoover's suggestion.

A rubber man just back from Akron says:

> Rubber prices are low right now because the American industry is not buying at the present time. My trip to the tire capital told me the story. Tire manufacturers are not buying because they are using the stock they have on hand, purchased at low figures. If car production is cut, you may expect even less buying of crude rubber.
>
> As yet we have not got around to cooperative buying, but I think we will if the Webb-Pomerene act legalizes such action. Undoubtedly a big buying association will be formed, each of the large consumers having representation on the purchasing board, and this association will be in a position to buy for the entire industry on this side of the ocean.
>
> I am not looking for the growers to retaliate by forming selling syndicates because I believe it would be impossible to control the situation. I doubt if the Netherlands and Ceylon would go into such a deal and I am certain it would be impossible for such a syndicate to control the natives.

American Chain Earned $5.16 Share Last Year

NEW YORK, March 31—A net income of $3,098,684, after depreciation and Federal taxes, is reported for 1923 by the American Chain Co., Inc., compared with $1,000,375 in 1922. This is equivalent to $5.16 a share earned on the 350,000 shares (par $25) 8 per cent Class A stock and 250,000 no par common shares. After annual dividends of $2 on common both issues share equally in any further distribution.

The company's consolidated income account for 1923 shows an operating profit of $4,776,116, against $2,074,014. Against this is charged $981,161 depreciation, $444,944 interest and $251,327 Federal taxes.

Men of the Industry and What They Are Doing

Clyde Jennings with Franklin

Clyde Jennings, formerly editor of *Motor Age*, a Class Journal publication, has joined the forces of the Franklin Automobile Co. of Syracuse, and will specialize on dealer development work under the direction of Vice-President F. E. Moskovics. Mr. Jennings has had a wide experience in dealer development through his editorial connections, and he enters this new field well equipped, because of this and the many friends he has made among the retailers of motor cars in the last five years. Before joining the editorial department of the Class Journal Co. Mr. Jennings acted as St. Louis correspondent of *Motor Age* and *Motor World*, specializing in investigating dealer conditions in this territory.

Newmark Opens Advertising Agency

J. H. Newmark, for more than fifteen years associated with Durant and General Motors interests, has established his own business under the name of J. H. Newmark, Inc., and will conduct a general advertising agency, continuing to direct Durant sales promotion activities and to create and place the advertising of Durant enterprises through his independent organization. The Newmark agency will be located in the Fisk Building, New York City. Mr. Newmark's connection with the industry started in 1906 with the Oldsmobile. From 1908 to 1914 he was identified with Oakland as advertising manager, and from 1914 to 1921 he was wtih Chevrolet in the same capacity at the executive offices in New York. From June, 1921, to May, 1922, he was a member of the Advisory Staff of General Motors, from which position he resigned to renew his association with W. C. Durant.

Dan C. Swander Resigns

Dan C. Swander has resigned as vice-president of the Eaton Axle & Spring Co. At the time of the purchase of the Perfection spring business, of which Mr. Swander was general manager, by the Eaton Co., Mr. Swander had made other plans for himself, but he was induced to remain with the new company through the transition period in order to hold the organization together. Now that this has been done, Mr. Swander plans a long deferred vacation, with a trip to California before settling down to his new work. Mr. Swander first gained recognition as New York manager of the Firestone Tire & Rubber Co., joining the Standard Parts Co. as supervisor of sales, and later taking entire charge of the Perfection spring division under the receiver.

Resignation of John A. Rose

John A. Rose, manager of the export sales department of the Nash Motors Co., has resigned to engage in an undertaking he has had under consideration for some time, details of which are not ready for announcement. He leaves with the best wishes and regrets of President C. W. Nash. Mr. Rose joined the sales organization of the Thomas B. Jeffery Co. as a special traveling representative, and until 1915 he traveled practically the entire country, with the exception of the Pacific Coast. In 1915 C. T. Jeffery assigned him the task of creating and developing an export sales department, and in 1916, when Mr. Nash took over the company, Mr. Rose was continued in the work.

Gardner Visiting Europe

Russell E. Gardner, Jr., president of the Gardner Motor Co., Inc., is in Europe for a six weeks' tour of England and France. The object of his trip is to study the development of four-wheel brakes, balloon tires and body styles.

Wiley Is Auburn Export Manager

R. S. Wiley has been named manager of export of the Auburn Automobile Co. of Auburn, Ind. Mr. Wiley has been a member of the Auburn organization for a number of years.

Keller Manages G. M. of Canada

K. T. Keller, formerly manager of production of the Chevrolet Motor Co., has been made general manager of General Motors of Canada, Ltd., with headquarters at Oshawa, Ontario. Mr. Keller will report to R. S. McLaughlin, president of the Canadian General Motors.

Fuller Advances Dowsett

Fred R. Dowsett, who came to the Fuller & Sons Manufacturing Co., Kalamazoo, Mich., from Chicago about a year and a half ago as production manager, has been advanced to the position of general manager and invested with considerably added authority.

Mansfield with Maxwell

J. D. Mansfield, for many years sales manager of the Dort Motor Car Co., has resigned to join the Maxwell-Chrysler interests, having charge of their Canadian business.

Represent Eaton Axle Divisions

E. H. Janes, W. H. Wallace and D. R. Swinton will represent the bumper, spring and axle divisions of the Eaton Axle & Spring Co., with headquarters in the company's new offices in the General Motors Building, Detroit.

Curtis Addresses Engineers

L. F. Curtis, chief engineer of the American Bosch Magneto Corp., addressed the Springfield (Mass.) section of the American Institute of Electrical Engineers March 31 on "High Tension Ignition."

A. E. A. to Cooperate to Improve Service

Sentiment Expressed at Convention for Closer Working with Car Manufacturers

NEW ORLEANS, April 2—A suggestion for cooperation between automotive equipment manufacturers and automobile makers to bring about better service for the motoring public was the keynote of the Automotive Equipment Association's opening session at the spring convention here.

Convention sentiment strongly supported the recommendation in President W. E. Wissler's report that means be developed to work with the car manufacturers so that the dealer and garage shops might be adequately equipped for service so that stocks of replacement parts might be made available for prompt and efficient maintenance work in every community.

Mr. Wissler, who is general manager of the Herring Motor Co., Des Moines, a jobbing house, declared that the car population of the country is too great to be serviced by the car dealers. Independent shops must fill the gap and equipment and car manufacturers ought to be working together with the assistance of the jobbers who distribute many million dollars' worth of replacement parts to help these independents do their job right.

Encroach on Jobbers' Business

Mr. Wissler called attention to the encroachment of car manufacturers on the jobbers' business. In view of the jobbers' service to the trade, he said it was unfair for car manufacturers to sell to the retail trade accessories which they buy in excess of original equipment needs at prices far below those obtainable by jobbers. He also urged a comprehensive campaign to influence car owners to buy more equipment and to patronize legitimate dealers.

Discussion around the convention showed that the number of general automotive equipment jobbers handling replacement parts is increasing rapidly. In recognition of this trend a new phase of the A. E. A. merchandising campaign was launched, featured by a motion picture, "Profitable Maintenance."

Howard J. Burnish Transferred

Howard J. Burnish, for the last six years chief engineer of the gas engine plant of the Worthington Pump & Machinery Corp. at the Cudahy works, has been transferred to the compressor engineering department of the company at Cincinnati.

Truck Makers Meet Owners in Detroit

Marks Opening of Closer Relations—Felt That Same Problems Concern Both

DETROIT, March 31—The holding of a joint meeting by Motor Truck Industries, Inc., the organization of specialized truck manufacturers, and the Detroit Transportation Association, composed of cartage and fleet owners of the city, marks the opening of a relationship with truck operators which the truck manufacturing association plans to extend generally throughout the country.

Speaking at the meeting, M. L. Pulcher, president of the Federal Motor Truck Co., as well as of Motor Truck Industries, indicated that much that was detrimental to the interests of both the manufacturer and owner was a common problem, and as such should be combatted jointly. Unfavorable legislation on road administration or on taxes, which handicapped the user, reflected back on the business of the manufacturer and called for united opposition, he said.

Stackpole Among Speakers

Speakers at the evening meeting with owners were Mr. Pulcher, who presided, S. T. Stackpole, division freight agent of the Pennsylvania Railroad; F. L. Henk, secretary of the Detroit Transportation Association; W. J. Gray, first vice-president of the First National Bank, and Carl Oberstadt, automotive efficiency engineer. Others at the speakers table were O. W. Hayes, president of the Republic Motor Truck Co., Inc.; A. L. Swank, sales manager of the Long Manufacturing Co.; E. B. Ross, vice-president of the Clark Equipment Co., and C. J. Helm, general manager of the Acme Motor Truck Co.

Aside from cooperation on legislative work, Mr. Henk said truck manufacturers could render an important service to commercial haulers if they would compel their dealers to do business only with legitimate buyers. Wildcat sales methods, he said, are constantly bringing irresponsible operators into the field, who after a period of hit or miss operation fall by the wayside. While in business they injure the legitimate operator, Mr. Henk said, and their trucks in turn often fall into other irresponsible hands when they sell out or are forced out.

Henk Tells of Experiences

He outlined several deals which had come to the attention of the Detroit association, in which men were lured from shop jobs by dealers who held out visions of large profits in truck operation merely to sell some trucks. Keep dealers out of shady sales, he advised, and help to strengthen the companies which are doing business along legitimate lines.

Mr. Stackpole outlined some of the experiments the Pennsylvania Railroad is making in the use of trucks for less than carload shipments over short hauls. These have shown that the ultimate development of trucks in railroad use will be for this work, for the motorization of terminals and for store-door deliveries. Experiments so far, Mr. Stackpole said, had been conducted under contract with truck operators, but the probable development would be the organization of truck subsidiaries by the railroad companies to handle this work.

In addition to the economy features of truck operations to date, the railroad has found them looking toward less handling of shipments and better service. More cars will be made available for carload shipments, Mr. Stackpole said, as the railroads are able to use trucks for less than carload shipments. The average load in cars used for less than carloads, he said, was 6½ tons, as compared with loads of 29 tons in full cars. Five hundred cars would be taken from the tracks in Philadelphia, he said, by use of trucks between terminals.

Expansion of railroad facilities can better be accomplished by using trucks from outlying terminals than by expanding present terminals in cities, Mr. Stackpole stated, declaring that the railroads are looking for an expansion of one-third over present requirements by 1930. The Pennsylvania Railroad, Mr. Stackpole said, is seeking to work out an express-freight service, whereby shipments would be handled and billed direct from shipper to consignee.

Rollin Appoints Agents to Handle Foreign Sales

CLEVELAND, April 2—The Rollin Motor Co. has opened an aggressive campaign in the foreign markets.

B. D. Richardson, who has spent years in the industry in the Latin American countries, is in charge of Rollin sales in Central and South America, with headquarters at Buenos Aires.

William S. Lantz has been assigned to the Far East, with headquarters at Calcutta, India.

Australia and New Zealand is the territory of Charles S. Wright, whose headquarters are at Sydney.

J. F. Cooke sailed last week for South Africa to handle sales in that country.

Trailer Makers Begin Standardization Work

DETROIT, March 31—The Trailer Manufacturers Association has decided to standardize its products as far as possible and with that idea in mind it has started gathering blueprints and specifications from manufacturers of axles, springs and wheels to determine how reductions may be made in the number of types and sizes of these parts. This is only the preliminary step to a general standardization that will be attempted following the completion of this first effort.

In order to facilitate team work along standardization and simplification lines, the association will admit companies making trailer parts to associate membership.

Congress May Alter Merchant Marine Act

Bill Now Pending Would Aid Industry—Delegation Meets with Shipping Board

(*Continued from page* 791)

India Islands and the ports of Central and South America. This would include, Mr. Marvin pointed out, approximately 90 to 95 per cent of the entire automobile industry's exports.

The delegation was cordially received by the Shipping Board officials, but Edward P. Farley, chairman of the Board and president of the Emergency Fleet Corp., emphasized the fact that it was Congress that passed the law and that the Board had no other course but to enforce the provisions of the act.

He assured the manufacturers, however, that the Board had enough ships to take care of American exports and promised that, if there were any routes on which the Board did not have vessels and on which there was a demand, that ships would immediately be placed in service on such routes.

Further Assurance Given

On the second day of the meeting, the manufacturers went over the Board's facilities with the Traffic Department of the Emergency Fleet Corp. and secured the same assurance from the Traffic Department that no apprehension should be felt by American exporters as to the inadequacy of the Board's vessels.

Chairman Farley told the automobile manufacturers that the automobile industry had been one of the chief supporters of the American merchant marine, and that he desired to go on record to the effect that the industry wherever possible had given preference to American ships.

In the general discussion with the Shipping Board officials Mr. Marvin declared that he wished to make it plain that the automobile industry's support of the American merchant marine could be relied upon, but that at the same time the automobile manufacturers did not want to see their conquest of foreign trade hampered by having their foreign shipping facilities curtailed.

Personnel of Delegation

Representatives of the automotive industry in the delegation were

Morgan Goetchius, representative of the vice-president in charge of exports of the General Motors Corp.; M. C. Reichert, manager of the New York export office of the Studebaker Corp.; J. J. Palmer, assistant director of foreign sales of Dodge Brothers; H. Deuster, secretary of the foreign trade committee of the Motor and Accessory Manufacturers Association.

J. S. Marvin, manager of the traffic department of the N.A.C.C.; E. H. Hodges, traffic manager of the Hupp Motor Car Corp.; P. G. Findlay, traffic director of Dodge Brothers; G. F. Bauer and Pyke Johnson of the N.A.C.C.

REPORTS DIFFER ON USED CAR SALES

Minneapolis

MINNEAPOLIS, April 1—While the used car in this district is on a better basis than ever before, the outlook for spring business in new automobiles is not encouraging. Never have there been so few used cars on hand, and the demand for new cars is correspondingly affected. Distributors say that retail dealers in the farm districts are not stocking up.

In a way, due to open winter and passable roads, some of the usually expected April and May business may be said to have been discounted already. The condition results from the fact that the farmer has not come back yet and the farmer is the backbone of the trade in this territory. When the situation as to prices for farm products betters the outlook for the sale of new cars will improve a like amount.

Used cars are now sold on a better basis then they ever were. Dealers who formerly paid too high a margin for these cars have been forced by circumstances to pay only what they can get back.

More optimistic wholesalers of cars hope for an upturn in the trade as soon as spring is fairly under way. The first real snow of the winter arrived March 29 and this will have a stimulating effect on agricultural prospects.

Toledo

TOLEDO, April 1—Sales of motor cars at retail in this district are running about 15 per cent below the same period of last year. Dealers are at a loss to explain the hesitancy of the buying public, but believe that the weather is having considerable to do with slack buying.

All look for an increase in the next few weeks. There are only one or possibly two dealers in the city who have not all the cars they want at the present time and few are taking any more in the face of the selling conditions.

Farm sales appear to be somewhat better than the city business. Farmers bought their share last year and are probably in little better condition this spring. This business runs to the less expensive models.

The greater competition for business on new cars has brought about stronger conditions in the used car business. Dealers have stocks averaging about twenty-six cars each and this is slightly lower than at the same time last year. There is a better turnover in used cars than at any time in the last few months.

Birmingham

BIRMINGHAM, ALA., April 1—The spring outlook for the sale of cars in the Birmingham district is somewhat hazy on account of the clogged conditions of the used car market. Many of the dealers not only have their profits but a portion of their capital tied up in used cars, and there is no prospect of relief unless something unexpected happens or the factories come to their rescue.

Shipments to Birmingham are slow for the simple reason that dealers prefer to sell fewer cars at good profits than sell many cars and tie up their share of the sales in used cars for which there is no market.

General business conditions in Birmingham are good, and in spite of the used car conditions, many cars will be sold to people who have never owned an automobile before and to those who are willing to take a greatly reduced valuation on used cars.

Seattle

SEATTLE, April 1—Activity of the lumber industry and generally favorable business conditions in western Washington for the last five months have resulted in spring business opening up earlier and in larger volume than at any time since the boom wartime days. In fact, January and February sales were so active that some normal March business was done in those months.

Dealers in the Seattle territory have larger stocks on hand at this time than for several years, but they have bought in anticipation of a 25 per cent increase in sales in 1924 over 1923. These statements apply to the standard cars. Other makes cannot report quite as satisfactory business situations. The standard lines report an active turnover in used cars.

Milwaukee

MILWAUKEE, April 1—Retail sales of passenger cars in Milwaukee and nearby territory during March were adversely affected in some degree by disagreeable weather such as might be expected in this district in January or early February at the latest. Deliveries slowed up a great deal more than sales, for buyers were not anxious and many times unwilling to take delivery when weather conditions were feared so strongly. Quick deterioration of finish and appearance, and unreasonable demands upon the mechanism by the terrible condition of highways and even city pavements, were advanced as the reasons for waiting.

With the element of spring shortage of cars apparently absent, and talk of higher prices not taken seriously, while extreme winter conditions existed when the calendar said spring was here, dealers here have had a hard row to hoe all through March. On the basis of past experience, they may reasonably expect weather conditions to last until the middle of April. Confidence is expressed in every quarter that when spring does arrive to stay, business will witness a very strong and favorable reaction.

Denver

DENVER, April 1—Although exceptionally bad weather conditions more than half of the month make an accurate sizing up of the March trade situation rather difficult, leading dealers and distributors are able to give reports that average reasonably fair for the month's sales of both new and used cars. There is a unanimous belief that sales have been held back by the seventeen days of snow thus far this month, coupled with an unusual amount of severe cold weather for March in Colorado.

While reports from retail dealers throughout Denver's distributing territory present a rather gloomy outlook in districts depending largely upon such crops as potatoes and fruits, conditions gradually are growing more stable in stock-raising communities and also in the Pueblo district, where the Colorado Fuel & Iron Co.'s steel mills are running full blast. In fields enjoying oil development work, there is also a general feeling of cheerfulness.

Salt Lake City

SALT LAKE CITY, April 1—The spring outlook for the automobile industry in this section is excellent. Generally speaking, dealers have been stocking up to the limit of their financial capacity. Distributors report orders as coming in slower at this time than some weeks ago as a result of a return of winter, but they feel the lull is only temporary. February was a real spring month this year.

The predictions regarding increased business are based on the excellent industrial conditions. Unemployment in this section is practically nil, while new industries are opening up steadily. The new steel industry in Utah County is expected to do much for this State and the mountain country. Actual operations will begin in April.

The situation regarding used cars appears to be normal. Closed car sales are gaining over last year.

Dallas

DALLAS, TEX., April 1—Reports from a score of dealers scattered over the State show the actual sales made during the first three months of the year were 15 per cent greater than for the same period in 1923.

The used car situation continues a problem of the dealers. In Texas the greater part of the business is on the trade-in basis. In 75 per cent of the cases a new car sold means a used car in stock.

The situation in Texas is unlike that in many sections. The winters are not rigorous and the automobiles are used daily. The traffic is about as heavy as it is any time in the spring and summer.

BAD ROADS FIGURE IN SLOW BUSINESS

San Francisco

SAN FRANCISCO, April 1—Four factors have combined to slow up automobile sales in this section, and to make dealers cautious in stocking up for spring and early summer business.

First of these is the comparatively dry winter, with not enough rain to insure crops for the coming summer; second, and probably greatest, the hoof and mouth disease epidemic in central and northern California, with the resultant destruction of several thousand cattle and the embargo on automobile travel; third, the general unrest incidental to a presidential election year; and, fourth, the oil investigation, at Washington, with the probability that the California fields will be involved.

The lack of activity in buying is general in all makes of cars, and some dealers in cars priced around $2,000 estimate that their business, while ahead of last March, is fully 40 per cent under what it should be to average with the preceding months of this year.

Motor truck dealers have felt the slowing down even more keenly than passenger car dealers, while used cars of all makes are selling to better advantage than in either January or February. Rains late in March gave promise of better business for April, but this was about offset by fresh outbreaks of the hoof and mouth disease, and by the probability that these rains arrived too late to have much effect on crops production in this part of the State.

Kansas City

KANSAS CITY, MO., April 1—The last three months have been the worst in point of deliveries and sales of any like period for several years. The period is considerably below the same three months of 1923. The reason is obvious—condition of roads. All business has been similarly affected.

Many farmers have not been able to get in to town either for selling produce or for their own purchases for weeks at a time. Scores of milk and egg producers have carried their products across fields to get to hard roads where trucks can pick up the shipments. Sales efforts have been gravely handicapped also, both because salesmen could not travel the bad roads, and because prospects were frosted by the appearance of weather and roads.

One result of this situation is that there is an accumulation of sold cars waiting for delivery; and another result is that an accumulation of live prospects is waiting for the closing of contracts. It is certain that April, May and June will have a big volume, merely from this held-over business unfinished in the winter months.

Money is temporarily tight, chiefly because of the weather's effect on all trade. But the situation generally is not inherently bad. The review by the Federal Reserve Bank, issued April 1, was positively bright, showing improved situation in practically all basic lines.

Used cars are settling almost weekly into a deeper mire. Most companies have more used cars than they need, and it is said that the prospect is for greater stocks with the larger volume of new car sales this spring.

Trucks seem to be moving slowly even in the city; even the lighter trucks failing so far to show the briskness expected. But the opening of spring is expected to put life into this trade also.

Los Angeles

LOS ANGELES, April 1—Judging by registration reports and statements of some dealers, there is an appreciable slackening in demand for motor vehicles in southern California. New cars are accumulating in storage. Asked if this was in preparation for anticipated improved selling conditions, dealers declared they would not be warehousing cars if they had purchasers for them.

For the first time in many months it now is possible to get immediate delivery at retail of almost any make and model. The Ford coupe is the most pronounced exception.

Dealers have slashed trade-in values of used cars to the bone, and some say this has had a bearing on the slowing up of new sales, as owners refuse to trade at offered allowance prices.

Statistics just issued show the decline in registrations for February amounts to about 3 per cent from the same month last year.

Columbus

COLUMBUS, OHIO, April 1—The automobile business in Columbus shows signs of a slowing up, but this is attributed largely to the unfavorable weather conditions. The lateness of the spring undoubtedly has held up business to a large extent, and distributors and agencies are accumulating heavy stocks because of the slowness. Some other factors, however, enter into the situation, as there is considerable business unrest, which is being reflected on automobile sales.

City business is considerably behind that at the same time last year. Country business has been rather quiet, but bad roads are given as the chief cause. Farmers are now in a better position to buy passenger cars than a year ago, and better trade from rural buyers is expected when spring arrives.

There is a good deal of unemployment in Columbus, but probably not as much as in some other centers. But this fact is having its effect on the trade, and purchasers are not as numerous as last spring

Boston

BOSTON, April 1—New England dealers as a whole are entering April with a feeling that they have much work ahead of them to run their sales totals up to the quota they set out to sell. A number of distributors in Boston have figured that the show this year brought about 50 per cent of the orders they expected. They realize that the storm kept the outside buyers away, and the huge crowds the closing days interfered with buying somewhat. They will be very busy next week delivering cars to those who never take them until after April 1 so as to escape the property tax.

Sales of the high priced cars have been exceptionally good. Those in the medium field have held up fairly well. Some of the distributors of lower priced cars say that orders are not coming in as they should. Others report that they are satisfied with conditions.

Because the blizzard at show week kept many outside dealers away distributors did not talk much about stocking up to those who came to the show. Now that the show is over the psychological time for getting dealers to stock up has gone by, and this will be reflected in slowing down of orders the factories expected from this territory.

St. Louis

ST. LOUIS, April 1—With the opening of the spring selling season, local dealers report their sales have increased to a large extent and all express themselves as pleased with the early showing.

Stocks of cars on hand are heavy and are sufficient to take care of the first rush of spring orders. However, some dealers have said that they were not stocked as heavily this year as in the past because of the large investment necessary to carry a big stock. But the warehouses are comfortably filled and no one complains of a shortage of cars at this time.

Used cars are moving more rapidly with the advent of warm weather and it is expected that a steady increase in their sale will be noticed as soon as the last vestige of winter disappears.

Philadelphia

PHILADELPHIA, April 1—The spring outlook for the sale of cars in this territory is far ahead of that of a year ago. The buying season has started early, and sales are being made, especially in the low and medium-priced cars, so rapidly that many retailers have had to replenish their stocks, which are now quite large, in spite of the rapid turnover.

March sales in most cases were from 10 to 20 per cent better than in the corresponding month for 1923 and considerably in advance of February, 1924.

FINANCIAL NOTES

Edmund & Jones Corp. stockholders will meet April 14 to vote on a proposition to increase the authorized common stock from 40,000 to 80,000 shares and to amend the incorporation certificates so that "the capital of the concern shall at least be equal to the sum of the aggregate par value of all issued shares having par value, plus the aggregate amount of consideration received by the corporation for the issuance of shares without par value, plus such amounts as, from time to time, by resolution of the board may be transferred thereto."

Studebaker Corp. stockholders after reelecting all the old directors, who in turn reelected the officers, approved the plan for splitting common shares of $100 par into no-par common on the basis of two and one-half new shares for one of old. A total of 2,500,000 no par common shares was authorized. There will be issued in exchange for the 750,000 common shares of $100 par, 1,875,000 no par shares. The remainder will be held in the treasury to be issued at the discretion of the directors.

Pierce-Arrow Motor Car Co. has concluded arrangements with its bankers for the renewal of $1,750,000 one year 6 per cent notes maturing April 16, 1924. Arrangements also have been made with the banks to increase loans, if necessary, in connection with the broadening of the company's market by adding a moderately priced car to its line. The cash balance exceeds $1,400,000 and it is stated no new financing is necessary.

Jordan Motor Car Co.'s income account for the first two months of this year shows net profits of $9,555 after expenses and interest charges, etc., but before Federal taxes. Sales of cars netted $1,589,232 and cost of sales was $1,385,127. Manufacturing profits totaled $204,105 and selling, administration and general expenses, $155,488. The company's surplus as of Feb. 29 was $2,138,938.

Continental Motors Corp. stockholders have approved the issue of $10,000,000 fifteen year sinking fund 6½ per cent gold bonds, the proceeds of which are to be used in retiring the 7 per cent gold notes outstanding and the company's bank debt. Of this total Halsey, Stuart & Co. has taken $7,500,000, while the balance of $2,500,000 will be retained in the treasury.

New York Transportation Co., of which the Fifth Avenue Coach Co. is a subsidiary, reports that the bus line had net income of $1,285,924 in 1923 after all charges and taxes, equal to $5.71 a share on the $2,350,000 of capital stock, compared with $1,141,059, or $4.85 a share in 1922. The consolidated statement shows a surplus of $815,924, against $671,059 in 1922.

Hudson Motor Car Co. stockholders have approved a stock dvidend of 10 per cent, payable April 15 to stock of record April 10. They also have approved increasing the common stock from 1,200,000 shares no par to 2,000,000. Of the new stock 120,000 will be used for paying the 10 per cent stock dividend and the remainder held for future use.

Hupp Motor Car Co. reports gross sales of $38,013,014 in 1923, against $34,122,847 in 1922. Net profits were $2,635,788, compared with $3,763,983, which, after deductions for preferred, equals $4.54 a share earned on the $5,711,310 common stock of $10 a share value outstanding, against $7.13. Surplus amounts to $2,039,846, contrasted to $3,185,901.

B. F. Goodrich Co. stockholders will be asked at the annual meeting to approve a reduction in the common stock from 1,500,000 to 750,000 shares. This, it is said, will not mean any change in the capital of the company so far as the stockholders are concerned, as all of the stock above 750,000 shares is held in the treasury.

Paige-Detroit Motor Car Co. stockholders have approved the plan to issue $3,000,000 in three-year 6½ per cent notes, maturing serially $500,000 each six months, beginning Dec. 1, 1924. Volume of business in January, February and March was $4,427,000, $5,461,000 and $6,800,000 respectively.

Yellow Cab Manufacturing Co.'s consolidated balance sheet as of Dec. 31, 1923, shows assets of $17,386,026, which includes $1,148,305 cash, $1,332,813, accounts receivable and $4,825,331, inventories. The report shows net profit of $4,020,094 after the usual deductions.

Indiana Truck Corp. has declared its regular quarterly dividend of 1¾ per cent on the preferred, payable April 1, to stockholders of record of March 31.

Dunlop Tire Marketing New Solid in Two Sizes

BUFFALO, April 2—The Dunlop Tire & Rubber Co. is marketing a solid cushion tire, to be known as the Dunlop cushion, which at present will be built in two sizes, 36 x 6 and 36 x 5.

The design of the Dunlop cushion is highly individualized. Through the center of the tire is a typical Dunlop mileage strip. On each side and placed at angles are blocks somewhat of the same pattern as those on the standard Dunlop solid non-skid. These blocks serve to grip the road.

The cushion or air channel of the tire, which runs through the center of the base just above the corrugated rim on which it is mounted, is claimed to eliminate the hot spot or region of fatigue found in some solids.

New Motor Car Division Created by Case T. M. Co.

RACINE, WIS., April 2—The Case T. M. Co. has created a new department of its business, to be known as the Case Motor Car Division. This will be in charge of G. B. Gunlogson, who has been with the company for fourteen years, in which time he has been in charge of the service department, research engineering, sales promotion and advertising.

Mr. Gunlogson has had extensive experience in selling and field work, and the new division will build up a strong sales and service organization.

AVERY ASKS BANKRUPTCY

CHICAGO, April 2—A voluntary petition in bankruptcy has been filed by the Avery Co. of Peoria, Ill., manuacturer of tractors and farm implements. Liabilities are put at $6,000,000 and assets at $8,000,000. It is said liabilities do not include stock and other obligations. John W. McDowell of the Title Trust Co., Peoria, has been named receiver.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

A tightening of money rates and a further recession in general commodity prices were features of the business situation last week. The hesitation with regard to future commitments still prevails in most markets. A strengthening in stock quotations and in grain and cotton prices was observed on Monday of this week.

The production of crude petroleum in the week ended March 22 averaged 1,906,850 barrels a day, comparing with a daily average of 1,911,750 barrels in the preceding week and 1,846,600 in the corresponding period last year. The greatest reduction was shown in California, where the average fell from 654,000 to 645,500 barrels.

Business failures reported to Bradstreet's for the week ended March 27 numbered 431 as against 392 the week before and 380 a year ago.

Bank debits to individual accounts reported to the Federal Reserve Board from 244 centers for the week ended March 26 totaled $9,829,000,000, showing a decline of about 2.6 per cent from the total for the preceding week, but an increase of 7 per cent as compared with the corresponding week last year.

Fisher's index of wholesale commodity prices stood at 146.9 last week, comparing with 149.2 the week before and 167 a year ago, and marking the seventh successive decline from the year's high in the week of Feb. 9. Bradstreet's food index stood 1.2 per cent lower than in the preceding week and 5 per cent lower than a year ago.

Discounts by Federal Reserve banks increased $51,000,000 during the week ended March 26, most of the gain being in bills secured by Government obligations.

Loans of reporting member banks increased $151,000,000 during the week ended March 19, the gain being about equally divided between loans secured by stocks and bonds and commercial loans. Investments increased $35,000,000, while borrowings from Federal Reserve banks declined $53,000,000. Net demand deposits increased $71,000,000.

The withdrawal of funds by interior banks and end-of-month requirements combined to produce a tightening in the money market last week. Call loan rates rose from 3 to 5½ per cent, while time money moved in small volume at 4¼ to 4¾ per cent, according to maturity.

DART TRUCK SOLD

WATERLOO, IOWA, April 1—The Dart Truck & Tractor Co. has been sold in receiver's sale to Waterloo business men, and in the future will be operated as the Hawkeye Dart Truck Co. The new officers are: A. H. Caward, president; W. B. Caward, vice-president; H. S. Caward, treasurer, and H. C. Wurster, secretary.

Retail Demand Rules Schedules at Plants

Manufacturers Will Not Increase Programs Until Conditions in Field Warrant

NEW YORK, March 31—Actual retail demand is governing operations in automobile producing plants and no attempt will be made to increase manufacturing schedules until conditions are thoroughly analyzed and the extent to which the buying public can absorb the output is apparent. Producers generally believe that with the coming of spring-like weather there will be a perceptible forward movement. Up to now, March weather conditions have retarded sales and kept stocks from moving as rapidly as was anticipated earlier in the year.

The conservative attitude adopted by producers will keep the industry from establishing new output records until it is shown that all cars produced will be absorbed. With good weather, the early part of April should give a clear indication of the extent to which buying will go this spring and should present a base on which manufacturers can build their future production schedules.

Business Was Running High

Sales in January and February, up to the time bad weather set in, were excellent, and the industry, basing its outlook for future sales on the returns for those months, turned out in January 316,148 cars and trucks, as compared with 243,539 in the same month last year, and in February 367,435, as against 276,934 last February. About 10 per cent of this output was motor trucks and the rest passenger cars. February of this year was surpassed by only three months of last year in output volume.

High production marks during the pre-spring season were aimed at by the industry so that when the heavy buying movement started there would be a sufficient surplus of cars to take care of the demand. Throughout that production period producers showed no tendency to overload the market. Now that a surplus has been accumulated and the opening of what is still anticipated as being a heavy buying period has been delayed, no effort will be made to continue operations at a record breaking level.

Commitments are being made cautiously with parts makers. No evidence has been given, however, that any great curtailment of operations is contemplated, or that all producers in the industry will share in the slowing down. Manufacturers are holding themselves in a position to speed up to high levels as soon as they are justified in so doing by conditions in the retail sales field.

INDUSTRIAL NOTES

Mutual Wheel Co., Moline, Ill., has received orders from the Firestone Steel Products Co., Akron, Ohio, for manufacture of wheels for balloon tire use. The Akron factory has been forced to farm out its work and the Mutual Wheel plant has been pushed to capacity production.

Link Belt Co. has bought a site for a factory and warehouse on the Pere Marquette Railroad in Detroit. The company will proceed at once to build a warehouse and office building and will erect a factory later. The warehouse will provide a place for the present distribution of the company's product to the automotive factories in the Detroit district.

Plant Operations Wait on Big Buying Movement

(*Continued from page* 801)

have reduced output are actuated solely by a desire to keep stocks mobile and to guard against overstocking. There isn't a factory that regards any of its dealers as being overstocked. One of the outstanding features of the present market condition is that factories with direct dealer contracts seem to be less affected by the slowing down than those operating through distributors.

Dealers operating under distributors are reported as taking cars in considerable volume, but apparently the distributors are waiting for further inroads into their stocks before taking more cars from the factories. Sales of high priced cars appear less affected by weather conditions than those in the lower and medium priced fields.

Cadillac and Packard are continuing at normal schedules, and Lincoln and Wills Ste. Claire business is on the increase. The Lincoln plant has brought its schedule to approximately thirty-five cars daily. Wills Sainte Claire reports sales to be ahead of production, and it is seeking an output in April of 600 cars.

Balloon Tire Committee Appointed by N. A. C. C.

NEW YORK, April 3—Directors of the National Automobile Chamber of Commerce at their monthly meeting today approved the balloon tire committee as named by President Charles Clifton.

On this committee are Alvan Macauley, Packard, chairman; H. H. Rice, Cadillac; O. C. Hutchinson, Hupp, and Robert C. Rueschaw, Reo. This committee is directed to investigate the balloon tire situation from the viewpoint of the car manufacturers.

METAL MARKETS

Try as the steel market would to minimize the untoward effect of the decline in automotive buying, gloominess is to the fore. As has been the case before when automotive demand slumped off, recourse is had to obsolete statistics in a hopeless effort to show that the automotive industries' steel consumption is not the vital factor in the steel market which, in fact, it has come to be.

"The automobile curtailment really amounts to little," says one of the Pittsburgh steel market statisticians. "Notwithstanding various published statements to the contrary, the automobile industry has been consuming only about 7 per cent of the steel production, and thus a curtailment of 15 per cent in that quarter means only 1 per cent of all the steel." According to so conservative authorities as "The Iron Age," the automotive industries consumed last year approximately 3,500,000 tons of steel, considerably more than 7 per cent of the total production of approximately 31,000,000 tons.

What is, however, far more important is that because the steel products entering into automotive consumption are bought in a relatively highly finished form, automotive support of the steel industry measured by dollars and cents, and not by tons, has come to be its very life blood, and any diminution of this support jeopardizes the well being of the entire steel market structure. Nothing has happened in the last few weeks except the slowing off in automotive demand to exert an unfavorable influence on the steel market, and it is solely due to this circumstance that the market today presents a flabby appearance all along the line.

Competition for what orders overhang the market has become very keen, and concessions heretofore in vogue are giving way to much more incisive price cutting. So far full-finished automobile sheets have suffered least from the change, but the undertone of the market for this specialty, which has ruled exceptionally firm so far, has turned decidedly easier, although most of the mills still have a comfortable reserve of business at full prices on their order books.

Pig Iron.—Automotive foundries are virtually out of the market. Even selling of single car lots has come to a standstill. Prices are strictly nominal in the absence of all interest in the part of melters.

Aluminum.—Heavy shipments continue to arrive from abroad, especially from Norway, and the sole domestic producer is still the recipient of outstanding tonnages of Norwegian ingots. Somewhat of a lull is noted in fresh automotive demand, but prices are maintained on the basis heretofore prevailing. The possibility of lessened automotive consumption brings with it the possibility of an increase in the number of resale offerings.

Copper.—Dullness enveloped the copper metal market in the last few days, and there has also been a falling off in the demand for copper and brass products. Rolling mills and wire drawers are watching the copper market closely, and will probably turn buyers when inducements offer.

Lead.—Small lots of lead arrived recently from abroad after the famine here had been relieved. The trend of the market continues toward lower levels, but in a very leisurely fashion, there being neither selling pressure nor much demand.

Zinc.—Demand is of retail proportions.

Calendar

SHOWS

Jan. 3-10—New York, National Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Bronx Armory.

Jan. 24-31—Chicago, National Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Coliseum and First Regiment Armory.

FOREIGN SHOWS

April 2-13—Barcelona, Automobile Exposition, under the auspices of the Confederacion de Camaras Sindicales Espanolas del Automovilismo y Ciellismo, Palacio de Arte Moderno.

April 6-27—Rosario, Argentina, under the auspices of the Automovil Club Argentino.

April 8-22—Milan, Annual Automobile Show, Sports Palace.

April 16-21—Johannesburg, South Africa, Witwatersrand Motor and Agricultural Show.

May 10-20—Madrid, Annual Automobile Show, under the auspices of the National Association of Automobile Importers, Palacio del Helo y del Automovil.

Aug. 23-Sept. 6—Toronto, Ont., National Automobile Show in conjunction with the Canadian National Exhibition under the sanction of the Canadian Automotive Equipment Association and the Automotive Industries of Canada.

Oct. 2-12—Paris, passenger cars, motor cycles, bicycles and accessories, Grand Palais.

Oct. 17-25—London, Annual Passenger Car Show, Olympia.

Oct. 22-31—Paris, motor trucks, stationary engines, garage tools and machine tools, Grand Palais.

RACES

April 24—Fresno.

April 27—Trapani, Italy, International Automobile Race.

May 30—Indianapolis.

June 14—Altoona.

July 4—Kansas City.

Aug. 3—Lyons, France, European Grand Prix.

Sept. 1—Altoona.

Sept. 1—Syracuse.

Oct. 4—Fresno.

Oct. 19—Kansas City.

Nov. 24—Los Angeles.

CONVENTIONS

April 28-30—Buffalo, Eighth Annual Meeting of the American Gear Manufacturers Association, Lafayette Hotel.

May 19-22 — Detroit, National Automotive Service Convention and Maintenance Equipment Show, under the auspices of the Service Division of the National Automobile Chamber of Commerce, General Motors Building.

May 21-24—Detroit, International Motor Transport Congress under the auspices of the National Automobile Chamber of Commerce.

June 3-4—Detroit, Midsummer Meeting of the Automobile Body Builders Association, Hotel Statler.

June — Washington, Pan American Highway Congress, under the auspices of the Pan American Highway Mission.

Sept. 22-26—Boston, Sixth Convention and International Steel Exposition of the American Society for Steel Treating.

S. A. E. MEETINGS

April 2—Milwaukee Section. The Future Passenger Car, C. W. Pendock, chief engineer, Le Roi Co.

April 3—Detroit Section, Chassis Lubrication, F. H. Gleason, General Motors Building, Detroit, 8 p. m. Dinner, 6.30 p. m.

April 17—Metropolitan Section. Fleet Maintenance, F. Winchester.

May 15—Metropolitan Section, What Roads and Steels Do to Automobiles.

June 24-27—Summer Meeting of the S. A. E., Spring Lake, N. J.

Oct. 21-24—S. A. E. Production Meeting, Detroit.

Nov. 18-19—Joint Service Meeting of the S. A. E. with the N. A. C. C. Cleveland.

—Aeronautical Meeting at Dayton at the time of the Pulitzer Races.

January—S. A. E. Annual Meeting, Detroit.

Insurance Control by States Opposed

WASHINGTON, April 1 — Opposition to compulsory automobile insurance by State laws was voiced at the annual conference of the National Association of Insurance Agents, which closed a three-day session here. Nearly one whole day was consumed by the agents in their discussion of two subjects relating to the automobile industry.

The first of these was "Compulsory Automobile Insurance by State Law," and the second, "The Insurance Activity of Automobile Clubs." While the subjects were supposed to be unrelated so far as the annual program of the convention was concerned, much of the actual discussion of one subject related to the other.

A resolution was almost unanimously adopted to the effect that while automobile insurance was a good thing, not only for the general public, but for the automobile owner as well, it was not within the province of the States to administer compulsory automobile insurance.

Specific opposition to the proposal of of the Maryland Legislature, embodied in a bill now pending there, to force all automobile owners to have a certain form of insurance, was voiced. W. G. Carter, president of the Maryland Association of Insurance Agents, told the members of the conference that the bill would be dangerous to the best interests of the insurance agents and not serve the best interest of the automotive public, inasmuch as it provided for a State controlled and administered insurance fund.

He denied that automobile insurance would be any cheaper under State rates than under the insurance companies' administration and rates.

J. A. Giberson of Alton, Ill., and Judge W. H. Tomlinson, secretary of the Ohio Insurance Agents Association, were others who voiced their opposition to a State controlled compulsory automobile insurance proposition, each of them taking the position that, while automobile insurance would be beneficial to the insurance companies and to the insured, it was an improper form of paternalism for the States to assume to administer the act in their jurisdiction.

In discussing the insurance activity of automobile clubs, the delegates expressed their opinion that the merging of the National Motorists Association and the American Automobile Association was not to the best interest of the insurance business or the merged associations. It was pointed out that the N. M. A. organization was one which had its inception solely for "service to the motorist," while the A. A. A. provided for various forms of insurance for its members.

Uruguay Increases Duty on Automotive Products

WASHINGTON, April 1 — An average increase of approximately 10 per cent in the import duties of automobiles, trucks, parts and accessories imported into Uruguay became effective on Jan. 28, the Tariff Division of the United States Department of Commerce has been advised by the American Consul at Montevideo.

The new tariff law provides that this increase shall be in force for three years. The former duty on automobiles and trucks was levied on an ad valorem basis, but the new schedule provides for an official valuation which has been specifically set for each make and type of car, the general provision being an increase of about 10 per cent in the customs duties.

Shippers Organize New Advisory Board

CHICAGO, March 31—The automotive industry is to be well represented on the committees of the Mid-West Regional Advisory Board, which was formally organized at a meeting held at the LaSalle Hotel here. Two distinct committees are to look after the interests of the automotive industry.

The Committee on Automobiles and Trucks will be headed by K. A. Moore of the National Automobile Chamber of Commerce as chairman, with George M. Sherman, general traffic manager of the Studebaker Corp., as vice-chairman. The Committee on Automobile Parts and Accessories will be headed by G. B. Newman, traffic manager of the Stewart-Warner Corp., Chicago, as chairman and G. B. Hetherington, traffic manager of the A. O. W. Smith Corp., Milwaukee, as vice-chairman.

The board is designed to obtain a better understanding between shippers and carriers and to advance the mutual interests of these two elements of industry. The board, of which R. C. Ross of Chicago is general chairman, and Robert Hula of Chicago, general vice-chairman, is to have parental authority over the various committees representing the different industrial interests, but each committee is to be given rather a free hand in the treatment of questions in its own field.

In event of a car shortage or rate complaint, for instance, affecting automotive shippers, one or both of the automotive committees will immediately take steps looking to an adjustment. The committees will be in constant touch with representatives of the railroads, although they will take no railroad representatives into the membership of the board.